



Imperial Bureau of Plant Breeding and Genetics

Plant Breeding Abstracts

Vol. XIII, No. 4.

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School of Agriculture
Cambridge
England

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* General studies, see also individual crops.

Plant Breeding Abstracts.

Vol. XIII, No. 4.

Part 1. Empire Section

STATISTICS 519

1012. PANSE, V. G. 519.24:631.42:633.51
Studies in the technique of field experiments. V. Size and shape of blocks and arrangement of plots in cotton trials.

Indian J. Agric. Sci. 1941 : 11 : 850-65.

The relation between block size and experimental error is examined using cotton uniformity trial data supplied by Hutchinson and Panse. There is a decrease in efficiency with increasing block size and compact blocks are preferable to less compact arrangements. A logarithmic relation is found between block efficiency and experimental error. The comparative precision of complete and incomplete block arrangements is discussed.

1013. KRISHNA IYER, P. V. 519.24:631.421:633.11(54)
Studies with wheat uniformity trial data. II. Balanced versus randomized arrangements.

Indian J. Agric. Sci. 1942 : 12 : 263-73.

An analysis of wheat uniformity data has shown that randomized and balanced arrangements are almost equal in their degree of efficiency; there is however a slight tendency for randomized blocks to be more accurate.

1014. KRISHNA IYER, P. V. 519.24:631.421:633.11(54)
Studies with wheat uniformity trial data. III. Distributions of variances and ratio of variances.

Indian J. Agric. Sci. 1942 : 12 : 274-80.

The effect of a non-normal distribution of material on the distributions of variances and the ratio of variances is considered with reference to wheat uniformity trial data.

1015. YATES, F. 519.271.3
Methods and purposes of agricultural surveys.

J.R. Soc. Arts 1943 : 91 : 367-79.

A general account of the methods applicable to agricultural surveys is given together with a consideration of sampling errors and the need for further development in statistical analysis.

1016. KRISHNA IYER, P. V. 519.271.3:631.421:633.11(54)
Studies with wheat uniformity trial data. I. Size and shape of experimental plots and the relative efficiency of different lay-outs.

Indian J. Agric. Sci. 1942 : 12 : 240-62.

Wheat uniformity trial data have been studied to determine the degree of precision obtained by various plot sizes and by various sampling techniques. In general, Latin square designs appear to be more efficient than randomized blocks.

BREEDING 575

1017. NEATBY, K. W. 575:633
Accelerating and guiding plant evolution.

C.S.T.A. Rev. 1943 : No. 36 : 5-11.

An elementary account is given of the general cytological and genetical principles that are utilized in breeding economic plants. Segregation of characters during hybridization experiments is explained by simple analogies and there is a brief mention of the usefulness of mutations and artificially-induced polyploids.

1018. DRUCE, G. 575:633(43.7)
Some Czechoslovak contributions to genetics (1866-1938).

Nature, Lond. 1943 : 151 : 495-96.

The article begins with a description of the classical experiments of Mendel and continues with an account of other genetical work carried out by Czechoslovak scientists, which includes the production of new crop varieties and breeding for disease resistance in plants such as wheat and sugar beet.

1019.

575:633(54.1)

Annual Report of the Department of Agriculture, Bengal, for the year 1939-40 (1940): Pt I: Pp 22; (1941): Pt II: Pp. 390.

The plant breeding mentioned in this report was carried out at the district farms and research stations.

The improvement of paddy varieties was continued and as before the work consisted of collections, variety tests, the study of pure lines and selection, tests of improved strains and selection of fixed hybrid strains. New work included the selection of desirable early strains of *aus* paddy and of high yielding hybrid strains of transplanted *aman* paddy. Patnai paddy when grown in different districts outyielded the local varieties and resisted flooding to some extent.

Investigations on pure lines, selected strains and trials of improved selected strains of wheat were conducted at three of the farms.

The pure line study of pulses and the collection, trial and propagation of many different fruit varieties was continued.

1020.

575:633(67.8)

East African Agricultural Research Station, Amani. Thirteenth Annual Report 1940.

H.M. Stationery Office, London. 1941 : price 6d. (Colonial No. 181). Pp. 22.

Considerable progress has been made during the year on the breeding of economic plants. The following are brief statements on some of the results of this work given in the report: improvement of cassava varieties for resistance to the viruses, mosaic and brown streak, was undertaken and the preliminary results show that some success has been attained; the claims for the resistance to streak disease of inbred lines of Peruvian Yellow Flint maize, received at the station, were confirmed, and the plants were selfed, crossed between themselves and crossed with certain East African types of maize; promising *Agave* hybrids, with which further trials will be made, were developed; coffee material was treated with colchicine; and chromosome counts were made with specimens of *Derris*.

1021.

575:633(71)

Report of the Minister of Agriculture for the Dominion of Canada for the year ended March 31, 1942, Ottawa, Pp. 162.

Many of the investigations on crop plants mentioned in this report have been carried out along the lines of the determination of varieties resistant or susceptible to a number of plant diseases and the breeding of new resistant varieties, and varietal testing and improvement of plants for other desired qualities. Some of the results which have been obtained are as follows: of 7162 hybrid potato seedlings tested, 1800 possessing a high degree of resistance to late blight combined with other favourable horticultural qualities were isolated and 100 promising scab resistant varieties were developed by crossing American commercial varieties and European stocks; varietal differences in susceptibility to four common ear and stalk rotting fungi were indicated when inbred lines of maize were tested; the annual survey of physiological races of stem rust present in Canada indicates that Race 29 is taking the place of Race 56 as the dominant race; new cereal varieties produced at different stations include a winter hardy wheat variety named Rideau, a hull-less smut-resistant oat variety called Brighton and two good quality barley varieties with the names Plush and Prospect.

1022. BALLANTYNE, J. P. S.

575:633(71.3)

Results of experiments 1936-1940. Experimental Station, Kapuskasing, Ontario.

Dep. Agric., Dom. Canad. 1942 : Pp. 43.

During the past five years, many varieties and strains of spring wheat, oats, barley, field peas, field beans, winter wheat and winter rye, have been tested to determine those suitable for growing in northern Ontario; notes are given on the most suitable varieties of each of the above plants, as compared with the standard varieties.

A large number of selections have been made from hybrid field pea material and 2 or 3 selections are promising; up to the present, these have proved considerably earlier and have yielded as well or better than the standard variety Chancellor.

Varieties of a number of plants, which are classed in the report as small fruits and vegetables, have also been tested and the best varieties are given.

1023.

575:633(72.92)

Annual Report of the Department of Agriculture, Jamaica, for the year ended 31st March, 1942 : Pp. 18.

Varietal trials, selections and hybridizations of many economic plants have been carried out at different locations in the island; several new sugar-cane varieties were tested for resistance to mosaic disease; among other work on maize improvement, a number of strains of a flint type with a richer yellow colour than found in local varieties have been bred by the hybridization of local with imported varieties, and these strains are being selected for stabilization of type; crosses between the Gros Michel banana variety and a wild diploid banana immune to Panama disease, were continued and a number of recently imported wild types have been used as pollen parents.

In the report of the Agricultural Officer, Turks and Caicos Islands, for the period ending 31st March, 1942, it is stated that varietal trials took place with a number of plants obtained from Jamaica.

1024.

575:633(72.98)

Report of the Agricultural Department, St. Kitts-Nevis, for the year ended 31st December, 1939 (1940) : Pp. 38.

Report of the Agricultural Department, St. Kitts-Nevis, for the year ended 31st December, 1940 : Pp. 8.

Agricultural investigations at St. Kitts included sugar cane, cotton and sweet potato variety trials, and the selection of promising types of maize. The sugar cane varieties suited to areas of different rainfall are given. Cotton varietal differences were not significant and of 9 Barbados sweet potato seedlings tested, B.5, B.44 and B.29 were the highest yielders but possessed cooking qualities which were inferior to those of some of the older varieties on the island. Varietal tests of a number of food and other economic crops and the establishment of a sugar nursery, comprised part of the work undertaken at Nevis.

The results of the cotton variety trials at St. Kitts showed that the variety M.S.I. (Montserrat) was outstanding in yield of both seed cotton and lint; the results at Nevis were not significant. The report also includes data on the performances of sugar cane varieties in different areas and the statement that selections of Sea Island cotton (St. Kitts superfine type) and maize were made at St. Kitts.

1025.

575:633

Scientific reports of the Imperial Agricultural Research Institute, New Delhi, for the year ending 30th June, 1941 (1942) : Pp. 73.

These reports contain much information about the progress made in breeding new varieties suitable for India.

Sugar cane.

Much work has been done at Coimbatore on sugar cane and investigations on inter-generic hybrids have continued. The sorghum hybrid Co.356 has proved popular in Bihar while the cross between variety P.O.J.2725 and the Malayan weed *Imperata* is being used as a breeding parent on account of its good juice and early maturation. Eleven new varieties have been given field tests and of these Co.462 has shown vigorous growth accompanied however by low sucrose content. Anatomical characters are becoming of importance to breeders as it has been found that the hardness of the leaf mid-rib is correlated with resistance to the top-borer (*Scirphophaga*) and hybrids derived from *Saccharum spontaneum* have proved important in this connexion. Hybrid sterility has been overcome in some cases by crossing with a nearly allied hybrid, for instance the cross Vellai x *Saccharum narenga* will give seed with Vellai x *S. spontaneum*.

Wheat.

Wheat breeding has been principally concerned in developing varieties resistant to rust and smut. Few varieties are immune to smut but some hybrids between Indian types and recently introduced *T. vulgare* varieties from Kenya are proving resistant to black rust. A recent field trial with 260 varieties to test for drought resistance gave only 13 useful selections. Some work has also been done by the statistical branch on sampling errors in wheat uniformity trials. Hybrid vigour has been investigated and has been found to vary much with environmental conditions. The success of vernalization depends a great deal also on environmental conditions after sowing as well as on the particular variety used.

Potatoes.

Potatoes are being bred for resistance to early and late blight and to virus diseases. Some of the hybrids between *Solanum tuberosum*, *S. Antipoviczii* and *S. demissum* are proving resistant to late blight but *S. Rybinii* which has been claimed as resistant to viruses suffered necrotic infection after grafting and also gives non-resistant hybrids with *S. tuberosum*. Varietal nomenclature of Indian potatoes has been simplified by field trials with the commonly grown varieties and the recognition and elimination of duplicate names.

Brassica.

The taxonomy of the genus *Brassica* has been studied from the cytological point of view. It is pointed out that the self-sterility of the plants makes their genetical study difficult but two mutations, "apetalous" (in sarsen) and "closed petal" (in toria), have been discovered in which the flowers are not visited by insects and these may be useful in establishing pure lines. A haploid toria showing dwarfing is also reported together with a chimaeral plant that produced both diploid and tetraploid flowering shoots.

Tobacco.

Efforts are being made to induce polyploidy in *Nicotiana* hybrids by means of colchicine. The cross *Nicotiana glauca* x *N. plumbaginifolia* is sterile but produces some seed when back-crossed to *N. glauca*. The statement sometimes made that tobacco varieties introduced into India soon deteriorate due to the climate has been refuted by comparison between freshly introduced and well-established lines of Morrison's Special. Hybrid vigour has been studied in the genus and in one cross a distinct difference between the reciprocals was noticed.

Miscellaneous.

Flax and pigeon-pea are being bred for resistance to rust and wilt respectively. Cytological work on chillies has demonstrated the existence of a naturally occurring triploid in the variety I.P.51; it is highly sterile and forms a variable number of trivalents and univalents at meiosis. 1026.

575:633-2-1.521.6(54)

**Annual Report of the Imperial Council of Agricultural Research,
Delhi, 1941-42 (1943) : Pp. 130.**

Varietal tests of economic plants made at the various Indian experimental stations are summarized. Nine new selections of rice suitable for the Central provinces gave up to 24% increased yield over standard varieties. Two new physiological races of rust are reported: R. 34, a black rust and race H, a yellow rust. Cereal breeding has continued and the wheat C.228 came out very high in a baking test. Millet and pulses have been studied for resistance to *Striga*; selections of Bilichigan and Muddinandy were resistant but the African Sorghum Bonganhilo, supposed to be immune, was found susceptible to *Striga densiflora*. Three new strains of castor have been released in Madras and semi-fertile hybrids of toria and sarsen have been grown in the Punjab. There have been several trials of citrus fruit stocks. The cytology of *Papaya* ($2n = 18$) has been investigated for twelve varieties. Stock and yield trials have been made for apples; Rome Beauty (on eight different stocks), and Glengyle Red gave the highest yields in Mysore. Sunn hemp has been badly attacked by capsids to which the variety Cawnpore No. 12 has shown the greatest resistance. Several new varieties of sugar cane have been introduced; Co.527 is a high-yielding early variety released from Shahjehanpur and Co.356 and Co.513 have shown high yields and good quality in Bihar. In Madras, Co.542 and Co.540 are good early varieties while Co.411, Co.416 and Co.419, the latter especially suitable for swamp situations, are high-yielding late varieties.

GENETICS 575.1

1027.	SORNAY, M. A. DE. Les gènes. (Genes). Rev. Agric. Maurice 1942 : 21 : 181-96.	R. M. I.
A general account of the nature and behaviour of genes.		
1028.	MATHER, K. Polygenes in development. Nature, Lond. 1943 : 151 : p. 560. FABERGÉ, A. C. The concept of polygenes. Ibid. 1943 : 151 : p. 643.	575.113.4:575.4

Dr Mather replies to Dr Waddington's criticism (see "Plant Breeding Abstracts", Vol. XIII,

Abst. 660) indicating, among other things, the difference between his polygene concept and that of polymeric genes.

Dr Fabergé points out that the polygene concept, and the objections to it, are not new. Present-day work only differs from that of these early pioneers by its insistence on natural selection and by the idea that linked complexes will be built up through its operation.

ORIGIN OF SPECIES 576.1

1029. WATSON, E. V. 576.12:582:575.1
The dynamic approach to plant structure and its relation to modern taxonomic botany.
 Biol. Rev. 1943 : 18 : 65-77.

The conflict between taxonomy and modern work on plant structure is discussed with an indication of the lines on which the two points of view might be reconciled.

CYTOLOGY 576.3

1030. KHAN, R. 576.356.5:581.04:578.08(54)
Artificial induction of polyploidy with special reference to colchicine.
 Sci. and Cult. 1942 : 7 : 480-85.

The various methods available for artificial induction of polyploidy are described and discussed.

BOTANY 58

1031. LEWIS, D. 581.162.5
The physiology of incompatibility in plants. II. *Linum grandiflorum*.
 Ann. Bot. Lond. 1943 : 7 : 115-22.

It is suggested that incompatibility in the dimorphic species *Linum grandiflorum* is due (1) to unsuitable osmotic pressure differences between the pollen and the style and (2) to the nature of the cell colloids.

1032. DICKSON, B. T. 582:001.4
Standardized plant names. A list of standard common names for the more important Australian grasses, other pasture plants, and weeds.
 Bull. Coun. Sci. Industr. Res. Aust. 1942 : No. 156 : Pp. 99.

An extensive list of common names of Australian pasture plants and weeds is presented. Latin names and synonyms are given and it is suggested the list of common names should be accepted as the standard one.

AGRICULTURE 63

1033. FERGUSSON, D. *et al.* 63.00.15(41)
Agricultural Improvement Council for England and Wales. First Report.
 Rep. Minist. Agric. Fish., Lond. 1943 : Pp. 18.

A report is given on the first year of operation of the Council. Its activities have included widespread demonstrations of cereal varieties. The Council suggests that there is need for a more extensive testing and demonstration of improved methods of vegetable production resulting from the work of research stations.

Linseed variety trials have shown that the three North American varieties Royal, Bison and Redwing, outyield the Argentine variety Plate or La Plata, which is at present grown in Great Britain.

PLANT DISEASES 632

1034. MARTYN, E. B. 632-1.521.6:633(72.92)
Diseases of plants in Jamaica.

Bull. Dep. Sci. Agric., Jamaica 1942: No. 32 (N.S.): Pp. 34.

A description is given of the plant diseases which occur in Jamaica and in certain cases resistant varieties are named.

1035.

633.1(71.24)

Saskatchewan cereal variety recommendations for 1943.

Saskatch. Cereal Var. Comm., Sask. 1942 : December 14-15. Pp. 7.

A list is given of the cereal varieties recommended by the Saskatchewan Cereal Variety Committee for each of the cereal variety zones of the state, together with a map showing these zones. The recommended varieties, other varieties grown in the state and promising new varieties not yet recommended are described with regard to many of their characteristics.

1036.

633.1-2.451-1.521.6:575(71.3)

CHRISTIE, G. I.

633.2/3-2-1.521.6

Report of the President for the year ending March 31st, 1942.

67th Rep. Ont. Agric. Coll. Exp. Fm 1941 (1942) : Pp. 69.

Two varieties of winter wheat, Dawtas and Junior No. 6, have been found resistant to smut. Barley is being bred for resistance to mildew and the variety Trebi has shown resistance to loose smut. Forage grasses and red clover are being selected for rust resistance and the latter for root rot, mosaic, and mildew resistance as well.

1037. HARRINGTON, J. B. and

WHITEHOUSE, J.

633.1.00.14(71.24)

Cereal variety results at Saskatoon, 1937-1943.

Circ. Coll. Agric. Univ. Saskatchewan 1943 : No. 539 : Pp. 9 (Mimeographed).

Tables are given summarizing the results of the comparative rod row plot tests of standard varieties of spring wheat, oats, barley and flax, undertaken at the University of Saskatchewan during the years 1937 to 1942.

Mention is made of the methods of statistical analysis of the data used and of the climatic conditions prevailing each year and the effects on the yields.

WHEAT 633.11†

1038. THOMPSON, W. P.

BRITTON, E. J. and

HARDING, J. C.

633.11:575.127.2:576.356.5:581.04:576.16(71)

The artificial synthesis of a 42-chromosome species resembling common wheat.

Canad. J. Res. 1943 : 21 : Sect. C : 134-44.

An attempt has been made to synthesize *Triticum vulgare* by crossing *T. turgidum* ($n = 14$) with *Aegilops speltoides* ($n = 7$) and then doubling the chromosomes in the F_1 by the colchicine method. The resulting amphidiploid has the same chromosome number ($n = 21$) as *T. vulgare* and agrees with the latter species in a considerable number of morphological characters; it crosses with it and forms a fertile hybrid. Although the amphidiploid produced is very similar to *T. vulgare*, lack of complete identity is shown by a few divergent morphological features and by the lowered fertility and a few meiotic abnormalities in the hybrid.

1039. CHIN, T. C. and

CHWANG, C. S.

633.11:576.312.32:575.127.2(51)

The cytology of "blue" wheat hybrids.

Indian J. Agric. Sci. 1942 : 12 : 661-78.

The cytology of hybrids between the Szechwan varieties: "blue" wheat and dwarf hill-wheat, and *Triticum durum*, *T. turgidum*, *T. pyramdale*, *T. vulgare* and *T. sphaerococcum* is described. Both the Chinese varieties form 14 bivalents at meiosis.

The hybrid "blue" wheat x *T. durum* usually produces two quadrivalents and ten bivalents and a bridge is frequently found at anaphase I. With *T. turgidum*, only one multiple configuration is found, sometimes a quadrivalent but more usually a trivalent. It is deduced from these facts and from the high chiasmata frequency of the former hybrid that "blue" wheat is most closely allied to *T. turgidum* and that it differs from *T. durum* by one inversion; the multiple configurations are regarded as due to external interchange.

One quadrivalent and up to two single bridges per cell are found in the hybrid dwarf hill-wheat x *T. pyramdale*. These observations, together with the high chiasmata frequency of the hybrid and the dwarf habit and absence of wax of the dwarf hill-wheat, suggest a fairly close affinity between the two varieties.

T. vulgare x "blue" wheat forms one quadrivalent and one trivalent and an average of

* See also Absts 1021 and 1026.

† See also Absts 1021 and 1025.

8.8 univalents while *T. sphaerococcum* x "blue" forms two trivalents with an average of 8.4 univalents. Bridges occur at anaphase in both these hybrids. Various minor meiotic abnormalities are also described.

1040. KNOWLES, P. F. 633.11:581.46:575.113(71)

A second factor for awn barbing in durum wheat.

Canad. J. Res. 1943 : 21 : Sect. C : 198-204.

Two pairs of factors *Rr* and *Ss* have been shown to determine awn barbing in wheat. *R* is a complete dominant and eustatic to *S*; it determines "rough" awn. *S* is only partially dominant and when homozygous (*rrSS*) determines "intermediate" barbing. The heterozygous plants (*rrSs*) have "near-smooth" awns and the homozygous recessives (*rrss*) "smooth" awns. No linkage has been observed between the two factors or between either of them and those determining pubescence and colour of glumes and colour of awns.

1041. PHIPPS, I. F.,

HOCKLEY, S. R. and

PUGSLEY, A. T.

633.11-2.4-1.521.6:575.12

Warigo—a disease-resistant wheat.

J. Aust. Inst. Agric. Sci. 1943 : 9 : 17-20.

Warigo is a selection (line 37-76) from Nabawa x Hope; it combines satisfactory yield with resistance to stem rust, leaf rust, flag smut, loose smut and powdery mildew.

1042. SIMS, H. J.,

WEBB, C. G. and

BLACKBURN, G.

633.11-2.451.3-1.521.6(94.5)

Mallee wheat experiments. Variety trials at Walpeup.

J. Dep. Agric. Vict. 1943 : 41 : 169-72.

The results of varietal tests for yield and resistance to flag smut are presented.

OATS 633.13*

1043. SIMS, H. J.

633.13:575(94.5)

Mallee oat variety trials. Results at Walpeup Research Station.

J. Dep. Agric., Vict. 1943 : 41 : 1-5.

The hay and grain yields of oat varieties tested at Walpeup during the years 1932-42 are discussed in this paper.

The new selection of Algerian named Algeribee has consistently outyielded its parent variety in tests throughout Mallee, and is replacing it as a standard late maturing type.

It is stated that efforts are being made to produce a type which will withstand storms to a greater degree than existing varieties.

RYE 633.14

1044. WHITESIDE, A. G. O.

633.14.00.14(71)

Report of uniform winter rye variety trials. 1941 crop.

Rep. Cereal Div., Dom. Exp. Fm, Ottawa 1942 : No. 54 : Pp. 9. (Mimeo-graphed).

Figures are given for the number of bushels per acre, length of straw, kernel weight, and average percentage of winter killing of a number of winter rye varieties grown in 15 different Canadian experimental stations.

MAIZE 633.15†

1045. LARTER, L. N. H.

633.15:575.061.6(72.92)

Seed corn.

J. Jamaica Agric. Soc. 1943 : 47 : 26-28.

Jamaica growers are recommended to grow yellow maize instead of the red at present most popular. A new yellow variety J.S.Y. (Jamaica Selected Yellow) has been obtained by the Department of Agriculture from the variety Red Hybridized after selection and hybridization; this yields 62 to 64 lbs. dry bushel weight, is hardy and stands up well to weevil attack.

1046. COWAN, J. R.

633.15:575.12

The value of double cross hybrids involving inbreds of similar and diverse genetic origin.

Sci. Agric. 1943 : 23 : 287-96.

The top cross test was used to compare the combining ability with respect to yield of inbred

* See also Abst. 1021.

† See also Abst. 1023.

lines of similar and diverse genetic origin in single crosses and predicted double crosses in maize. Where unrelated inbreds were used there was a positive and highly significant correlation between top cross yields and their yields in single crosses and predicted double crosses. There was no correlation when related inbreds were used.

The author indicates the possibilities available in selecting inbreds from parents of different hereditary make-up for use in double crosses. C. M. D.

1047

633.15-2.7-1.521.6

The maize stalk-borer.

Fmg S. Afr. 1942 : 17 : 763-66.

In this paper, which describes the life history of the maize stalk borer and the methods by which it may be controlled, it is stated that there is little hope of obtaining resistant strains or varieties. Some varieties when grown next to more susceptible varieties are slightly less attacked, but when grown alone are infested to the same extent as these apparently more attractive varieties. Varietal differences in resistance are only shown because of the different rates of growth among the different varieties.

1048. OLSON, P. J.,

HARRISON, T. J.,

BLAKEMAN, J. E. and

WHITEMAN, R.

633.15.00.14(71.27)

Corn in Manitoba.

Publ. Manitoba Dep. Agric. Immigr. 1942 : No. 178 : Pp. 24.

As the result of yield tests, the variety Falconer is recommended for grain production and Rainbow for forage. The yield of Falconer exceeded that of the three hybrid types tested.

BARLEY 633.16*

1049. MEREDITH, W. O. S.

633.16:519.241.1:581.6

Prediction of malt extract of hybrid barleys.

Sci. Agric. 1943 : 23 : 355-61.

It is shown that there is a high positive correlation ($r = .824$) between barley extract and malt extract. Since barley extract may be determined at a much earlier stage than malt extract, this correlation will be useful to plant breeders who are selecting lines for high malt extract.

1050. ANDERSON, J. A.,

MEREDITH, W. O. S. and

SALLANS, H. R.

633.16:581.6(71)

Malting quality of Canadian barleys. IV. A summary of information of special interest to plant breeders.

Sci. Agric. 1943 : 23 : 297-314.

It is pointed out that malting quality may be defined differently in different countries as malting techniques and public tastes differ. The malting quality desired in Canada is defined and problems facing plant breeders are discussed. A description is given of the malting qualities of twenty-eight varieties, and the ways used for selecting promising new hybrid lines are outlined.

C. M. D.

MILLETS AND SORGHUM 633.17†

1051. RANGASWAMI AYYANGAR, G. N. and

VENKATARAMANA REDDY, T.

633.174:575.11.061.6(54)

Seedling-adult colour relationships and inheritance in sorghum.

Indian J. Agric. Sci. 1942 : 12 : 341-63.

Four factors controlling pigmentation in the young sorghum plant are reported. Two pairs of factors: PC , pc and PJ , pj , regulate the colour of the shoot. Three phenotypes may be found: (a) shoot with "deep purple" markings, $PCPCPJPJ$, (b) shoot with "purple" markings, $PCPCpjpj$ and (c) shoot green, either $pcpcPJPJ$ or $pcpcpjpj$. The roots present three colour forms which are also controlled by the interaction of two gene pairs: P , p and Q , q . The phenotypes may be: (a) reddish purple, $PPQQ$, (b) blackish purple, $PPqq$ or (c) brown, either $ppQQ$ or $ppqq$. Out of these four genes, only two, PC and P are linked; the cross-over value is 18.0%.

The relation between seedling and adult pigmentation is established.

*See also Abst. 1021.

†See also Abst. 1026.

1052. RANGASWAMI AYYANGAR, G. N. *et al.* 633.174:582:575.11
The description of crop plant characters and their ranges of variation. IV. The variability of Indian sorghum (jowar).
 Indian J. Agric. Sci. 1942 : 12 : 528-63.

A schedule for a detailed morphological and physiological description of Indian *Sorghum* varieties is presented and there is a useful appendix listing the genes so far discovered in the genus.

ROOTS AND TUBERS 633.4*

1053. CADMAN, C. H. 633.491:576.354.46:576.356.5
Nature of tetraploidy in cultivated European potatoes.
 Nature, Lond. 1943 : 152 : 103-04.

As many as eight tetravalents have been found at metaphase in the pollen-mother-cells of the variety Flourball. Pentavalents, hexavalents and octovalents have also been found and are perhaps due to segmental interchange between non-homologous chromosomes. These facts are held to indicate that cultivated potatoes are tetraploid.

1054. ARNASON, T. J. 633.491:581.162.5
Female sterility in potatoes.
 Canad. J. Res. 1943 : 21 : Sect. C : 41-56.

It is estimated that, although from 600 to 900 ovules start development in a potato ovary, only 0-472 seeds are finally produced.

The abortion of ovules was studied in the newly opened flowers of the following varieties: Minn. 75-5, Earlaine, Irish Cobbler, Sebago, U.S.D.A. 46000, Early Ohio and Netted Gem. Varietal differences in percentage of aborted ovules ranged from 10% in Minn. 75-5 and 15% in Earlaine to 80% in U.S.D.A. 46000 and 100% in Netted Gem. The abortion is thought to be due to irregularities at meiosis and to the presence of sterility genes. Premature flower and bud abscission, whilst present in all varieties, is shown to be more effective in some (Netted Gem, Early Ohio) than in others (Minn. 75-5, Earlaine).

It is considered possible that lethal genes causing ovule abortion may also cause pollen sterility, since no variety with high pollen fertility is known to be female sterile. J. G. H.

1055. BATES, G. H. 633.491:581.165(42)
Propagation of potato seed tubers from stems.
 Nature, Lond. 1943 : 152 : p. 135.

A method of clonal reproduction of potatoes using defoliated stems is described. Tubers develop from the leaf axils when these are not exposed to light.

1056. 633.491-2.411.4-1.521.6:575.127.2(41)
 633.491-2.8-1.521.6:575.127.2(41)
The Scottish Plant Breeding Station, Craigs House, Corstorphine, Edinburgh.
 Trans. Highl. Agric. Soc. Scot. 1943 : 55 : 100-02.

Some success has been achieved in breeding potatoes for resistance to blight. The fungus comprises several physiological races, one of wide distribution and the others rather localized. One of the latter races is much more virulent than the common strain. Selections resistant to both these races have been obtained from back-crossing the progeny of crosses between cultivated varieties and *Solanum demissum*. Breeding from these types however is difficult owing to the high degree of pollen sterility. A 48-chromosome hybrid of *S. demissum* ($2n = 72$) x *S. Rybini* ($2n = 24$) crosses readily with cultivated varieties and the progeny and back-cross progeny of the triple cross exhibit an exceptional degree of pollen fertility. Up to the present, these selections have only shown resistance to the common strain of blight.

Promising selections combining blight resistance with resistance to viruses A and X have been obtained by using Epicure, King Edward VII, Ninetyfold and Craigs Defiance as female parents.

1057. GEMMELL, A. P. 633.491-2.6-1.521.6
The resistance of potato varieties to *Heterodera schachtii*, Schmidt, the potato-root eelworm.
 Ann. Appl. Biol. 1943 : 30 : 67-70.

The potato varieties Epicure and Doon Star permitted the production of fewer and smaller

*See also Absts 1021 and 1025.

cysts of *Heterodera schachtii* on their roots than the varieties Majestic and Golden Wonder when all were grown under standard conditions in pots. The number of larvae which emerged from cysts under the stimulus of potato root excretion was less with Epicure and Doon Star cysts than Majestic and Golden Wonder cysts of the same volume. It is suggested that the resistance is physiological rather than anatomical.

C. M. D.

1058. COCKERHAM, G.

Potato breeding for virus resistance.

Ann. Appl. Biol. 1943 : 30 : 105-08.

It has been possible to obtain a high degree of tolerance to all virus diseases but Y in commercial varieties. An effective field-immunity by top-necrosis to viruses X, A, B and C is said to be dependent upon single dominant genes with autotetraploid inheritance. The factors *Nx*, *Na*, *Nb* and *Nc* are postulated. Though usually occurring in the simplex condition, *Nx* and *Nc* have been found in the duplex condition. Shamrock appears to have an aggregate of factors which prevents infection with leaf-roll. Epicure on the other hand possesses some of the factors in the dispersed form. These factors are liable to be scattered by outbreeding but it should be possible to aggregate them by inbreeding.

Factors for resistance have been found in the South American species as follows:—*Nx* in 26 clones of 5 species: *S. tuberosum*, *S. andigenum*, *S. Parodii*, *S. curtilobum* and *S. Juzepczukii*; *Na* in 45 clones of 10 species: *S. ajuscoense*, *S. chacoense*, *S. demissum*, *S. leptostigma*, *S. longipedicellatum*, *S. Salamanii*, *S. simplicifolium*, *S. infundibuliforme*, *S. andigenum* and *S. curtilobum*; *Nb* in 13 clones of 2 species: *S. andigenum* and *S. curtilobum*, and *Nc* in 16 clones of 3 species: *S. demissum*, *S. simplicifolium* and *S. andigenum*.

Successful infection of some clones has not yet been accomplished; for example in several trials in which scions bearing virus X were grafted to *S. Rybinii* and several varieties of *S. andigenum* and *S. curtilobum*, no symptoms were observed, nor was the virus recovered. It is possible that there are positive factors for resistance.

Trials with leaf-roll virus and virus Y are incomplete. Most of the South American species accept the Y virus though a few have failed to do so.

C. M. D.

FIBRES 633.5*

1059.

633.51:575.12:632-1.521.6

633.51:575.1

Progress reports from experiment stations. Season 1941-1942.

Programmes of experiments. Season 1942-1943.

Emp. Cott. Gr. Corp. Lond. 1943 : Pp. 183.

Progress in cotton breeding is reported separately for each experimental station.

Wells, W. G. Queensland. Cotton Research Station, Biloela. (pp. 1-26).

Miller 41.J, a selection from commercial stock of the variety Miller 41 has been found to have 20% increased resistance to jassid attack over other Miller strains.

Parnell, F. R. and South Africa. Cotton Experiment Station, Barberton.

MacDonald, D. Progress Report for the season 1941-42. (pp. 28-45).

It has been found that increased hairiness of the leaf reduces jassid attack but the presence or absence of hairs on the stem seems to bear no significant relation to jassid susceptibility. Some successful crosses, e.g. U.4 x Cambodia and U.4 x M.U.8, have been made in the effort to increase the hairiness of commercially valuable varieties. There is evidence however of correlation between hairiness and short lint.

Cameron, G. S. Southern Rhodesia. Cotton Station, Gatooma. Progress Report for the season 1941-42. (pp. 60-67).

Progenies of plants treated with acenaphthene have been reared; they are highly abnormal, almost unbranched and produce very few flowers.

Knight, R. L. and Anglo-Egyptian Sudan. Progress Report of the Plant Breeding Stations, season 1941-42. (pp. 68-90).

Gezira Research Farm.

A selection originating from P.S.S. 700 has proved highly resistant to leaf curl infection.

* See also Absts 1024 and 1026.

M.S.D.S. selections were all susceptible with the exception of the strains 87/39-5 and 133/39-8. An experiment is also in progress to determine whether M.S.D.S. lines have remained constant during the last ten years. Seed up to ten years old was available and this has been sown and the plants produced compared to the present lines. Significant differences in weight of seed cotton per boll, weight of lint per boll and lint length were observed. It is hoped that the next generation of these plants will decide whether the differences are due to storage effect or genetic changes.

Shambat Station.

The process of transferring blackarm resistance factors B_1 and B_2 from Uganda B.31 to Sakel has now been completed with the production of homozygotes for these genes. The attempt to transfer B_3 , a semi-dominant resistance factor very effective when homozygous, from *G. punctatum* to Sakel has proceeded as far as the sixth back-cross stage. Gene R (reddish flowers and leaves) is being transferred from *G. arboreum* to Sakel for flagging purposes. Progress has also been made in transferring gene H (hairiness correlated with jassid resistance) from Tangüis to Sakel. Twenty American Upland strains have been found to possess a blackarm resistance gene indistinguishable from B_2 and a start has been made to introduce the factor B_3 into some of these types.

Kadugli Station.

Deltapine has been the most outstanding variety in field trials made here.

Nye, G. W. and Jameson, J. D. *Uganda. Cotton Experiment Stations, Kawanda and Serere, Progress Reports for the season 1941-42.* (pp. 93-103).

Kawanda Zone.

Variety B.181 is resistant both to *Verticillium* wilt and blackarm; its good yield is however counterbalanced by irregular lint.

Serere Zone.

Maximum yields have been obtained with varieties B.P.50 and B.181.

Miller, R. W. R. and Peat, J. E. *Tanganyika Territory. Progress Reports on cotton work 1941-42. Ukariguru Experiment Station. Progress Report for the season 1941-42.* (pp. 104-16).

G.7092, a variety with high jassid resistance has too low a yield to be of economic value; MZ.561/6 on the other hand combines high yield with low resistance.

Ducker, H. C., Pearson, E. O. and Miller, W. L. *Nyasaland. Cotton Experiment Stations. Domira Bay Station, Progress Report, 1941-42.* (pp. 135-47).

Variety C.L.20 is very resistant to jassids and has also a high quality yield.

Hutchinson, J. B., Silow, R. A. and Stephens, S. G. *West Indies. Cotton Research Station, Trinidad. Genetics Department. Progress Report for the period October, 1941-September, 1942.* (pp. 168-74).

The five alleles of the crinkled dwarf series are shown to fall into two complementary series. Genetical behaviour of the St Vincent semi-sterile line has been explained by the hypothesis of a single factor producing complete gametic viability in the ova but almost complete elimination of male gametes. Leaf shape is shown to depend principally on the relative time of gene action when compared to the general development of the plant. A case has been found in which leaf mutations have induced mutation of alleles to their own level. Anomalous segregation of anthocyanin characters has been investigated and lint colour has been shown to depend on the interaction of three genes (one including an allelomorphic series) whose linkage groups have been identified. The inheritance of the character "corky" has been found to depend on at least two principal genes, one of which is lethal in the homozygous condition; suppressor genes also affect the action of the main genes. Colchicine treatment has produced a tetraploid *G. arboreum* from which triploid crosses have been obtained. A partially fertile hexaploid hybrid was obtained from the cross *G. barbadense* x *G. Raimondii*. Interspecific incompatibility between American and Asiatic species of *Gossypium* is probably due to failure of cross-fertilization and, more frequently, to a disturbed endosperm/zygote balance.

1060. IYENGAR, N. K. 633.51:576.356:575.127.2
Chromatin bridges in cotton.
Indian J. Agric. Sci. 1942 : 12 : 785-87.
Chromatin bridges have been observed in the triploid hybrids obtained from crossing the Asiatic species *G. herbaceum* with the American varieties *G. barbadense* and *G. hirsutum*. The implication of structural differences between these species is discussed.

1061. JACOB, K. T. 633.51:576.37(54)
Nuclear changes in the lint primordial cells of *Gossypium arboreum* var. *typicum* (Ki.)
Sci. and Cult. 1942 : 7 : 512-13.
Nuclear fusions have been observed in the lint primordial cells of *Gossypium arboreum* var. *typicum*.

1062. AHMAD, N. 633.51:581.6
Technological Reports on trade varieties of Indian cottons, 1942.
Technol. Bull. Indian Cott. Comm. 1942 : Series A, No. 55 : Pp. 106.
AHMAD, N.
Technological Reports on standard Indian cottons, 1942.
Ibid. 1942 : Series A, No. 56 : Pp. 106.
The annual reports on the grade and spinning performances of standard and trade varieties of Indian cotton are presented (cf. "Plant Breeding Abstracts", Vol. XII, Abst. 920).

1063. NAYAK, H. R. 633.51:581.6:575.74
Studies on the quality of Jaywant cotton grown from seeds obtained from different stages of propagation.
Indian J. Agric. Sci. 1942 : 12 : 865-72.
Jaywant cotton for general release is multiplied through six generations after leaving the breeders and these stages of propagation have been studied to see whether deterioration occurs. Fibre length, fibre maturity and maturity ratio remain unchanged but in the later stages there is a significant tendency for the cotton to become coarser, to give a lower ginning percentage and to have a lesser number of hairs per seed.

1064. HUTCHINSON, J. B. 633.51-1.524(72.92)
The cottons of Jamaica.
Trop. Agriculture, Trin. 1943 : 20 : 56-58.
An account of the taxonomy of Jamaica cotton is presented together with an analysis of the synonymy and a key to the chief types.
The indigenous cotton is *Gossypium hirsutum* var. *marie-galante* which occurs also in northern South America and in other islands of the Caribbean sea. Its ecology and range of variation both in the wild and cultivated state are described. *G. hirsutum* is only known from a record by Watt in 1907 while *G. hirsutum* var. *punctatum* appears to be confined to a single plantation. *G. barbadense* is successfully established in some of the more mesophytic localities in the island.

1065. 633.51-2.484-1.521.6:575(54)
What the scientists are doing. New cotton for Broach.
Indian Fmg 1943 : 4 : p. 37.
By crossing varieties Goghari and BD8, wilt-resistant segregates suitable for the Broach district have been obtained. Yield is 27-37% higher than BD8 although 10-16% less than the Broach local type.

1066. 633.523:575(54)
Monthly notes on progress of schemes. Agricultural research.
Bull. Indian Cent. Jute Comm. 1943 : 5 : p. 433.
A report is given on the performance of *Cochchorus capsularis* selections as compared with the control variety, in the trials held at four different locations.

SUGAR PLANTS 633.6*

1067. D....., H. H. 633.61:575(68)
Experiment Station notes. A mixed bag: fertiliser experiments.
S. Afr. Sug. J. 1943 : 27 : 99, 101.
It is reported that sugar cane seeds of No. 2259 (M. 173/38 x M. 72/31) and No. 2295 (M. 42/36 x

* See also Absts 1024-6.

M. 84/35) were received from Mauritius and sown in the glasshouse, where about 100 seedlings of No. 2259 were obtained, while none of the No. 2295 seeds germinated; these seedlings have been transplanted.

1068. STEVENSON, G. C. 633.61:575(69.82)
Une nouvelle variété de canne: la M. 112/34. (A new variety of sugar cane M. 112/34).

Rev. Agric. Maurice 1941 : 20 : 325-28.

M. 112/34 is derived from the cross R.P. 8 x P.O.J. 2878 made at the Sugar Cane Research Station, in which P.O.J. was used as the male parent. It is resistant to gummosis but further observations are necessary to determine its resistance to insects. It has a high yield and its juice is superior in quality.

R. M. I.

1069. CRAIG, N., STEVENSON, G. C. and EVANS, H. 633.61:575(69.82)
Annual report of the Sugar Cane Research Station for the year 1940.

Rev. Agric. Maurice 1941 : 20 : 358-63.

Breeding work was continued at Réduit. About sixty thousand seedlings were raised from 104 crosses which included crosses with *S. officinarum*, *S. spontaneum*, *S. Barberi*, *S. sinense* and *S. robustum*. Seedlings were selected and variety trials planned. Preliminary experiments have been made towards working out a method for testing varieties for resistance to red rot disease. As reported in Bulletin 17 (see "Plant Breeding Abstracts", Vol. XI, Abst. 285), it has been found that Uba Marot is a natural hybrid of a noble cane and the Indian form of *S. spontaneum* which grows wild in Mauritius. Uba Marot has been reproduced by making the cross experimentally. Seedlings which are the result of colchicine treatment are being grown for investigation.

Of the varieties tested, M. 168/32 and M. 134/32 had the highest resistance to *Phytalus*. R. M. I.

1070. STEVENSON, G. C. 633.61:581.056
The effect of different localities on the growth of sugarcane varieties.

Rev. Agric. Maurice 1942 : 21 : 167-73.

Different types of climate require different varieties of cane. New hybrid varieties are being produced with a certain proportion of wild ancestry; they are vigorous and resistant to disease. The work of breeding new varieties in Mauritius is briefly described and also the new variety M. 112/34 which is now being distributed.

R. M. I.

1071. DUTT, N. L. 633.61:581.143.26.035.1(54)
Control of flowering in sugarcane.
Indian Fmg 1943 : 4 : 11-13.

A general account of photoperiodism and its particular effect on sugar cane flowering is given. Sugar canes may be either long or short day plants according to the variety and the regulation of the time of flowering by controlling the photoperiod is important in hybridization experiments. Flowering may also be retarded by "topping" but this method reduces the size of the inflorescence considerably.

1072. DUTT, N. L. and KRISHNASWAMY, M. K. 633.61:581.162:575.127(67.61)
Protogyny in Uganda *spontaneum*.
Curr. Sci. 1943 : 12 : 24-26.

Certain sugar cane plants from Uganda with an erect habit and of the species *Saccharum spontaneum*, were grown at Coimbatore where it was observed that the flowers borne by these plants were protogynous. Advantage has been taken of this protogyny to cross one of these Uganda *spontaneum* plants with different species of *Saccharum*. It is also proposed to cross these plants with certain of the sorghum and bamboo seedlings, to obtain trigeneric hybrids with desirable characteristics.

1073. NARAIN, R. and SINGH, A. 633.61:581.6:519.271.3
Sampling of sugarcane for chemical analysis, II.
Indian J. Agric. Sci. 1942 : 12 : 822-36.

Coefficients of variation have been calculated for the juice, total solids and sucrose content of a

number of varieties grown under a range of environmental conditions. A high correlation exists between the coefficients of variation for total solids and sucrose. Except in one case, sucrose content has a higher coefficient than the other two qualities. The coefficient depends both on the variety and on the environment but does not show a significant decrease as the canes mature. The mean errors at the 5% level of probability for ten-stool samples are ± 2.1 , ± 0.72 , and ± 0.84 for the fruit juice, total solids and sucrose respectively.

1074. CHARTER, C. F. 633.61-1.4(72.98)
A tentative grouping of sugar-cane soils on the basis of their moisture relationships.

Rep. Sug. Cane Invest. Comm., Trinidad 1942 : 224-32.

Mention is made of the types of sugar cane varieties which should be grown on the soils of the different groups, and the suitability of the soils as media for froghopper breeding. Varieties selected for such soils should possess resistance to the secondary wilt which may follow attack by those pests.

1075. SORNAY, A. DE 633.61-1.557:519.24:578.08
Estimation of cane yields by means of random rows and stools.
Rev. Agric. Maurice 1942 : 21 : 107-13.

The method described is considered to be impracticable for the estimation of the whole crops but may give useful results when applied to the determination of the yield of single fields. A certain number of stools are selected at random, the number depending on the degree of accuracy desired, all are weighed together and the total yield calculated by multiplying by the appropriate factor. R. M. I.

1076. WIEHE, P. O. 633.61-2-1.521.6
La sensibilité de quelques variétés de cannes aux principales maladies existant à Maurice. (**The susceptibility of some varieties of sugar cane to the principal diseases in Mauritius.**)

Rev. Agric. Maurice 1942 : 21 : 225-26.

A list of varieties is given with indications of their susceptibility to the following diseases:—Gummosis (*Bacterium vasculorum* (Cobb) G.Sm.), leaf scald, (*B. albilineans* Ashby), *Colletotrichum falcatum* Went., root disease (caused by *Tylenchus*, *Pythium* and *Rhizoctonia*, etc.), smut, (*Ustilago Scitamineae* (Rab.) Syd.), chlorotic streak and eye spot (*Helminthosporium Sacchari* (V. Br. de Haan) Butler). R. M. I.

1077. 633.61-2-1.521.6(94)
"The Sugar Experiment Stations Acts 1900 to 1941". List of varieties of sugar cane approved for planting in 1943.
Aust. Sug. J. 1943 : 34 : 370-71, 373.

A list of varieties approved for planting in Australia in 1943 is given. The changes made in the list since the previous year are noted with a special reference to the incidence of Fiji disease.

1078. CHONA, B. L. 633.61-2.483-1.521.6(54)
Red-rot of sugarcane and its control.
Indian Fmg 1943 : 4 : 27-32.

Sugar cane varieties differ considerably in their resistance to red-rot (*Colletotrichum falcatum*). Some indigenous Indian varieties are resistant but the commonly planted Co.213 is very susceptible.

1079. 633.61.00.14(72.92)
Editorial.
Jamaican Ass. Sug. Technol. Quart. 1941 : 4 : 1-2.

INNES, R. F. and
GOODMAN, M. S.

Field experiments on sugar cane in Jamaica, (1940).
Ibid. 1941 : 4 : 2-68.

Work on field trials of sugar cane varieties is to be extended and a Varieties Committee has been formed for the purpose. Large numbers of seedlings bred specially for Jamaican conditions are being regularly received from the Barbados Experiment Station. A highly qualified sugar technologist is also to be appointed to deal with developments on the technical side.

In the present record of performance B 3439 is mentioned as one of the new Barbados varieties that has done best under local conditions, being superior in tonnage of cane and in juice composition.

1080. INNES, R. F. 633.61.00.14(72.92)
A survey of the yields of sugar cane in Jamaica during the 1940-1941 crop.

Bull. Dep. Sci. Agric., Jamaica 1942 : No. 31 (N.S.) : Pp. 31.

Included in the tables given in this bulletin, are data on the yields of the sugar cane varieties grown in each ecological division of the sugar producing areas of Jamaica; tables are also given comparing the yields which each variety gave in the divisions in which it was grown, the average yield of the varieties over the whole island crop for 1940-41 and for the years 1936-41. Graphs are given comparing the average yields from the main varieties during the 1940-41 crop with the mean yields for the 1933-40 crops; these graphs show the very high yields given by B.H. 10/12 and P.O.J. 2727, the superior ratooning of P.H. 10/12, and the inferior yields given by "mixed varieties".

1081. BELL, G. D. H. and BAUER, A. B. 633.63:581.143.26.035.1:575
Experiments on growing sugar beet under continuous illumination.
III. The production of a seed crop in the field and the resolution of a heterogeneous population.

J. Agric. Sci. 1943 : 33 : 85-94.

Twenty-four hour illumination has been found a useful technique for resolving the very heterogeneous range of forms included under the variety Hillesög. The various morphological forms segregated are discussed with reference to the generally recognized species *Beta vulgaris* and *B. maritima*. Shoot morphology is an important character for selection and the correlations between the various types of shoot recognized and root morphology, date of anthesis and date of ripening are discussed.

STIMULANTS 633.7*

1082. POUND, F. J. 633.74-2.422.1-1.521.6(72.98)
The quest for witches' broom resistant trees.

Proc. Agric Soc. Trin. Tob. 1943 : 43 : 55-63.

A stand of cacao trees resistant to witches' broom (*Taphrina*) has been located to the east of Iquitos between the River Nanay and the Amazon; the trees were derived from a pod brought from the region of the Rio Napo. Representative clones have been introduced into Trinidad.

1083. **Better hops.** 633.79:575(42)

Mon. Sci. News 1943 : No. 22 : 2-3.

Five Wye varieties: Brewer's Gold, Brewer's Favourite, Bullion Hop, Quality Hop and Fill-Pocket, have all found favour, firstly with brewers, secondly with growers, and were finally accepted by the Hops Marketing Board. All the above varieties give heavy yields and are considerably richer in soft resins than the commercial varieties and are equal or superior to the richest American hops (imported in large quantities in pre-war days) in this respect and in the flavour they give to beer.

1084. BEARD, F. H. 633.79:581.6(42)
Hops: their varieties and cultivation.

J. Inst. Brew. 1943 : 49 : 118-25.

This article includes a short account of the commonly planted hop varieties.

AROMATIC PLANTS 633.8*

1085. RAGHAVAN, T. S. and VENKATASUBBAN, K. R. 633.825:576.312.35:576.16(54)
Cytological studies in the family Zingiberaceae with special reference to chromosome number and cyto-taxonomy.

Proc. Indian Acad. Sci. 1943 : 17 : Sect. B : 118-32.

Chromosome numbers are published for a number of genera of the Zingiberaceae including the economic genera *Zingiber* and *Curcuma*. The comparative morphology of the chromosomes of the different genera is described and the authors discuss the significance of their findings in relation to phylogenetic hypotheses.

* See also Abst. 1025.

OIL PLANTS 633.85

1086. KUMAR, L. S. S. and
 RANGA RAO, D. S. 633.854.54:581.14:581.48(54)
Studies in the development of seed characters in linseed (*Linum usitatissimum*).

J. Univ. Bombay 1943 : 11 : Pt 5 : Sect. B : 113-19.

The seed development of a pure line C.P.3 from the Central Provinces is described. Capsule and seed weight, oil content and iodine value of the oil all reach a maximum by the end of six weeks after which there is a slight general decrease.

1087. 633.854.54:581.6(71)
Flax variety trials on Dominion Experimental Farms and Stations 1942.

Mimeogr. Rep. Cent. Exp. Fm, Cereal Div., Ottawa 1942 : No. 61 : Pp. 19.

Data on yield and quality of twenty-four varieties of flax grown in twelve Canadian localities are presented. The varieties Viking, 2558-2C, B. Golden Sel. and C.I.976 have the best combination of high oil content and high iodine value.

1088. 633.854.56:575(66.7)
Land Settlement in the Gold Coast.—Tung.

Crown Colonist, Lond. 1943 : 13 : No. 135 : p. 135.

The *Aleurites montana* and *A. triloba* tung species growing at Aburi have proved satisfactory and seeds from the most vigorous trees have been planted at Tafo for use in work on selection.

1089. PUTT, E. D. 633.854.78:581.6:519.241.1
Association of seed yield and oil content with other characters in the sunflower.
 Sci. Agric. 1943 : 23 : 377-83.
 PUTT, E. D. and
 UNRAU, J.
The influence of various cultural practices on seed and plant characters in the sunflower.
 Ibid. 1943 : 23 : 384-98.

The first paper presents the results of correlation studies undertaken with inbred lines of sunflowers over a period of 3 years, to measure the association of seed yield and oil content with other plant and seed characters, as a method of determining the path of selection for the improvement of material for these two qualities.

The results indicate that the attainment of high yield would be aided by selection for large heads and stems, and high oil content, by selecting for high kernel content; high yielding lines can still be obtained when selection for the characters early maturity and short stems, desired in types suitable for harvesting with a combine, is undertaken.

Negative correlations were found between seed size and oil content and seed size and kernel content, which is closely associated with oil content, but positive correlations were found between seed size and seed yield and seed yield and oil content, so that in selecting for seed size material should be chosen which will give the greatest oil yield, rather than the greatest seed yield or oil content alone.

The second paper records the influence of date of seeding, date of harvest and plant spacing within the row, on the plant and seed characters of the sunflower.

1090. MCGREGOR, W. G. 633.854.797.00.14:581.162.5(71)
Safflowers in Canada.

Cereal Div., Cent. Exp. Fm, Ottawa 1943 : No. 62 : Pp. 8. (Mimeographed).

Varietal tests have been made for the following characters: yield, oil content and iodine number. Plants will set seed when bees are excluded, although cross-fertilization increases the proportion.

RUBBER PLANTS 633.91

1091. 633.912:575(54.8)
Report of the work of the Rubber Research Board in 1941.

Rubb. Res. Scheme, Ceylon 1942 : Pp. 44.

Some of the rubber research work carried out in Ceylon during the year, is as follows: the establishment of a "museum" collection of clones, to aid in the search for trees resistant to

Oidium, was begun with the planting of 37 clones; extensive artificial pollinations were undertaken with parents which were mainly budded trees of high yielding seedling clones but owing to losses from different causes the aim of 25 seedlings each of 30 new families was not realized; pollinations were also made on clone BS. 3, an extremely fertile seed parent, with pollen from clones derived from high-yielding parents but not outstanding in yield themselves, and pollen from clones which are likely to be included in future breeding programmes; newly germinated seedlings were treated with colchicine and although it is probable that polyploid tissue was formed, the normal appearance of the stem and leaves suggested that the growth was resumed from diploid tissue.

FRUITS 634*

1092. BOWMAN, F. T.

Inheritance and use of vigour in pear seedlings.

J. Aust. Inst. Agric. Sci. 1943 : 9 : 24-29.

Varietal crosses have been made to ascertain the breeding behaviour of "inherent vigour". Most reciprocal crosses showed no significant difference in transmission of this character.

1093.

Annual Report of the Coconut Research Scheme for 1941.

Ceylon 1942: Sessional Paper XI : Pp. 19.

Some of the work reported by the Department of Genetics this year, is as follows: 15 of the palms raised from the dwarf palm nuts, mentioned in the previous year's report, are of the dwarf type, one is a tall type and the other is probably a hybrid semi-tall type, the number of years which these three types took to flower after transplantation being three to four, six and five respectively; the experiment, taking place on the Ratmalagara Estate, designed to compare selected and unselected seedlings derived from nuts obtained from high yielding palms, low yielding palms and palms from nuts taken at random from estate nut-heaps, is in its third year, and is designed to compare the probable yield potentials of seedlings and of the classes of seedlings embraced by the experiment, by measuring such characters as height, number of leaves, number of leaflets on the longest leaf and girth of pseudo-stem.

1094. DODDS, K. S.

634.771:575.12:576.312.32:632.4-1.521.6

The genetic system of banana varieties in relation to banana breeding.

Emp. J. Exp. Agric. 1943 : 11 : 89-98.

The breeding of a banana combining high fruit quality and resistance to Panama disease and *Cercospora* leaf spot is hardly possible without an understanding of the complex genetic systems found in the various varieties. The simplest and presumably ancestral varieties belong to the section of the genus with a basic chromosome number of 11 and are fully fertile diploids. Modern edible varieties, however, are highly sterile and this is due to at least three different causes. Parthenocarpy and female-sterility have been shown to be under genetic control in the variety Pisang Lilan. This diploid type has viable pollen but produces very few ovules; when, however, it is pollinated with the fully fertile diploid variety *Musa acuminata* Clone Calcutta 4, the F₁ is also parthenocarpic and female-sterile but with viable pollen. Secondly, the parthenocarpic varieties have been propagated vegetatively for many years and there has been an accumulation of chromosomal interchanges and inversions resulting in a high degree of structural hybridity, the degree of complexity being proportionate to the age of the clone. And thirdly, many edible varieties to-day are triploid and show the meiotic irregularities usual with such plants.

Associated with parthenocarpy and perhaps correlated with the high auxin content of the fruits, there is a general tendency for the production of unreduced embryo-sacs in the ovules. By pollinating these flowers, polyploids are quite easily formed. Increase in size and vigour only accompanies increase in number of chromosome sets in some instances. All higher polyploids than tetraploids show undesirable characters.

In addition to these cytological traits, there is the important genetical fact that the fruit quality depends not on the effect of point genes but on a particular gene-complex which, owing to structural hybridity, is almost invariably lost at meiosis.

All these features make banana breeding difficult and the following method of combining fruit quality with disease resistance is suggested. Gros Michel is a triploid with high quality fruit

*See also Abst. 1026.

and produces a number of unreduced triploid ova; it should be possible to fertilize these with pollen from a fertile diploid variety which has large fruit combined with disease resistance. In this way a tetraploid hybrid with high quality fruit and disease resistance might be formed. A suitable pollen parent has not been found yet. Exploration for new varieties and hybridization of known varieties are recommended. *Musa acuminata* Clone Tavoy is resistant and might be crossed with *M. Banksii*, a species with large fruit. Pisang Lilan is also resistant but has a horizontal inflorescence. Selfing tetraploids derived from Gros Michel destroys the parthenocarpic gene-complex but it is possible to obtain triploid and then diploid segregates that have large fruit; these could then be crossed with resistant species to obtain a suitable pollen parent for the original triploid Gros Michel.

VITICULTURE 634.8

1095.

634.835:575

634.11:575(74·7)

New varieties of fruits.

Gdnrs' Chron. 1943 : 113 : No. 2927 : p. 42.

An advance in the production of hardy varieties of *Vitis vinifera* by cross-breeding is noted in the new grape grown by the New York State Experiment Station at Geneva. The new variety named Seneca is hardy and has yellow, oval fruits with edible skins.

Three new types of the McIntosh apple are also noted from the same station: Kendall, Milton and Macoun. Milton ripens a month before McIntosh. R. M. I.

FORESTRY 634.9

1096. SMITH-WHITE, S.

634.973:576.312.32(94)

Cytological studies in the Myrtaceae. I. Microsporogenesis in several genera of the tribe Leptospermoideae.

Proc. Linn. Soc. N.S.W. 1942 : 67 : 335-42.

Thirty-eight species drawn from six genera (including *Eucalyptus*) of the tribe Leptospermoideae of the Myrtaceae have been examined cytologically. In all cases the haploid chromosome number is 11. Meiosis is fairly regular and the chromosomes are small and sometimes show secondary pairing. Meiotic abnormalities are most frequent in species suspected to be of hybrid origin.

VEGETABLES 635*

1097. ELDEN, H. VAN.

635-1.531.12:575.42

Production of vegetable seed.

Fmg S. Afr. 1942 : 17 : 807-08.

In this survey on vegetable seeds it is mentioned that certain standards of quality should be laid down, according to which the different types and varieties of vegetables can be selected for seed. There is a necessity for very drastic roguing in the field; in the early cross-pollinated vegetables, unless the inferior plants are removed as soon as they can be detected, roguing later will be ineffective. Varieties of the same kind of vegetable should be planted at least a mile apart to prevent cross-pollination.

1098. CRANE, M. B.

635.3:576.312.35

The origin and relationship of the Brassica crops.

J. R. Hort. Soc. 1943 : 68 : 172-74.

The commonly grown *Brassicaceae* fall into three groups: cabbages, cauliflowers, broccoli, Brussels sprouts, savoys, and Kohlrabi and a number of kales have a chromosome number of 18, turnips have 20 chromosomes and swedes and a few kales have 38. It is concluded that members of this last group are allotetraploids formed by hybridization and chromosome doubling of the first two groups. Yellow turnips are not, as sometimes supposed, hybrids between turnips and swedes although a hybrid between them had been obtained in Denmark by Frandsen and Winge.

1099.

635.36:575(41)

Brussels sprouts.

Adv. Leafl. Minist. Agric. Fish., Lancs. 1943 : No. 299 : Pp. 4.

Mention is made of the three Cambridge forms of Brussels sprout which are now available, Cambridge Nos 1, 3 and 5; No. 1 is an early form, No. 3 a midseason and No. 5 a late; Nos 1 and 3 are of average height and No. 5 is tall.

* See also Abst. 1022.

1100. HARGRAVE, P. D. 635.64-1.557(71)

Tomato varietal yield tests.
Sci. Agric. 1943 : 23 : 322-26.

A tomato yield test at the Provincial Horticultural Station, Brooks, Alberta is described and it is concluded that the newer determinate varieties outyield the indeterminate. The varieties Bison and Allred were included in the six best yielding varieties during each of the four years of the experiment. There is an opportunity for developing earlier varieties and it is suggested that hybrids derived from Farthest North may prove suitable.

1101. CUNNINGHAM, G. H. 635.64-2.484:576.16:631.521.6:575.12
Disease-free seed for tomato growers. Scientific experiment promises greatly reduced costs and freedom from pests.
Orchard. N.Z. 1941 : 14 : No. 9 : 23-24.

The variety Vetaimold is immune to all the physiological races of *Cladosporium fulvum* discovered in New Zealand. The resistant variety Globelle is being used to cross with Australian Dwarf and the variety Bay State is being selected for lines in which resistance is fixed.

1102. JOUBERT, T. G. LA G. 635.656:581.6:575
Hard-skin in peas.

Fmg S. Afr. 1942 : 17 : 767-68, 791-92.

Experiments were undertaken to determine the extent to which the hard skin of pea seeds was hereditary. The results obtained up to the present have shown that heredity has no effect on hard skin.

The writer nevertheless believes that the quality of the variety can be improved by selection in order to eliminate hard skin. This question, he says, will be investigated.

1103. RAMANUJAM, S. and 635.657:576.356.5:581.04(54)
JOSHI, A. B.
Colchicine-induced polyploidy in crop plants. I. Gram (*Cicer arietinum* L.).

Indian J. Agric. Sci. 1941 : 11 : 835-49.

The results of treating seedlings of variety IP25 of gram (*Cicer arietinum*) with colchicine are described. Tetraploids were obtained and their morphological features are described. Chromosome counts show that $4n = 32$ and at meiosis varying numbers of quadrivalents are formed but most frequently seven. Distribution of chromosomes at anaphase is fairly regular although gametes with $2n + 1$ and $2n - 1$ chromosomes were produced; these however do not appear to be functional and all the progeny of the first generation are euploid.

1104. SINGH, D. N., 635.659:582
BANSAL, R. K. and
MITAL, S. P.
***Cajanus obcordifolia* Singh. A new species of *Cajanus*.**

Indian J. Agric. Sci. 1942 : 12 : 779-84.

A new species is described which has obcordate leaflets with retuse, mucronate apices as compared with the oblong-lanceolate leaflets with acute to slightly acuminate apices of the common pigeon-pea (*Cajanus Cajan*). There are differences in the floral characters also.

B. P. P.

Part II. Foreign.

STATISTICS 519

1105. JOHNSON, I. J. and MURPHY, H. C. 519:631.421:633.13
Lattice and lattice square designs with oat uniformity data and in variety trials.

J. Amer. Soc. Agron. 1943 : 35 : 291-305.

The relative precisions of lattice square, triple lattice, simple lattice and randomized complete block techniques in collecting uniformity data for oats were investigated; the degree of precision was greatest for the lattice square and decreased in the order given above. The relative gain in precision of the lattice types, when compared with the randomized complete blocks, was in accordance with the degree of soil heterogeneity. In variety trials, the simple and triple lattices sometimes showed a gain in precision over the randomized complete blocks and sometimes a loss; the lattice square, in two tests, gave no gain of precision in one case and a 24% gain in the other.

BREEDING 575

1106. PIZA, S. DE TOLEDO (JUN.) 575:001.4(46.9)
Breves considerações em torno dos vocábulos "gen" e "cromossômio".
(**Brief considerations of the words "gene" and "chromosome".**)
Rev. Agric. S. Paulo 1943 : 18 : 109-12.

The correct form of these words to be adopted in the Portuguese language is discussed.

1107. 575:633(43)
576.356.5:633

Conferencias sobre Genética Vegetal Aplicada, pronunciadas por el Profesor Dr. W. Rudorf. (**Lectures on applied plant genetics delivered by Dr W. Rudorf.**)

Bol. Inst. Invest. Agron., Madr. 1943 : No. 8 : 149-237.

In the first of these lectures the achievements and difficulties of the plant breeder are illustrated by the production of wheats suitable for northern conditions, of the sugar beet, and the use of South American species for the production of potatoes resistant to blight and Colorado beetle. It is mentioned that at Müncheberg 600,000 potato seedlings are infected annually with *Phytophthora* and only some 10-25% prove resistant; attempts are now being made to select 60 chromosome plants among the *S. demissum* hybrids so as to preserve the resistant genes. Many high yielding resistant seedlings have now been obtained. For resistance to Colorado beetle *S. chacoense* is being used, since it gives fertile hybrids with 48 chromosomes by the functioning of an unreduced gamete. Reference is also made to the production of the sweet lupins, the area under which now amounts to over 150,000 hectares in Germany; sweet strains with indehiscent capsules are now being released.

Among soya bean populations from Manchukuo it has been possible to discover forms that mature even in the long European summers and give a yield of from 1,600 to 2,200 kg. per ha. Among the many thousands of seedlings obtained by hybridization an enormous variation in time of flowering is observed; the earliest flower by about 20th June and the latest flower only in November. Suitable forms for growing in north and east Germany have now been produced. The second lecture deals with the role of polyploidy in the evolution and improvement of cultivated plants, citing a number of cases where polyploid species show a greater adaptability than the diploids; certain exceptions are also noted. Mention is made of the gradual reversion of many autopolyploids in the course of generations to a cell size and fertility comparable with that of the diploids. Many instances of fertile amphidiploids, both natural and artificial, are cited. The various forms of *Triticale* still show varying degrees of sterility, which moreover is increased rather than reduced by crossing them together. While retailing the advantage and prospects of polyploids in some of the fruit trees, the disappointing results in certain other species are pointed out. Unpublished experiments of the author show that tetraploids of *Medicago albus*, *M. dentatus* and *M. messanensis* are fertile and show no gigantism, while the tetraploid of lucerne is sterile and shows normal growth. A tetraploid plant of *Poa fertilis* found in East Prussia is fertile and larger than the diploid. Fertile hybrids have been obtained, by colchicine treatment or other means, from the following potato crossings: *S. chacoense* x *S.*

tuberosum, *S. acaule* x *S. chacoense*, *S. demissum* x *S. verrucosum*, (*S. acaule* x *S. tuberosum*) x *S. demissum* and *S. demissum* x *S. chacoense*; all are suitable for crossing with *S. tuberosum*. Certain interspecific polyploids of *Datura* appear promising for use as medicinal plants. The third section deals with the alteration of the chemical constituents of a plant by means of selection. The sugar beet first showed the necessity for rapid methods capable of dealing with large numbers of individuals. The examination of several million plants was necessary for the discovery of the sweet lupins; the method of testing now consists, for *L. luteus* and *L. angustifolius*, of treating a portion of the epidermis attached to the petiole with I_2 in KI; in *L. albus* a drop of sap from the petiole is applied to a filter paper and this is tested with I_2 in KI. Similar methods have been elaborated, *inter alia*, for testing for alkaloid in *Galega officinalis* and *Trigonella foenum-graecum*, and for coumarin in *Melilotus albus*; plants low in coumarin have been obtained by crossing two parents with varying content.

The composition of the alkaloids in different plants varies, e.g. the alkaloid from the poppy Peragis contains 81-84% of morphine, while that from the variety Weisse Dame contains only 40-45%, the rest consisting of papaverine and narcotine. Tobacco varieties containing 8 to 12% of nicotine have been selected at Torchheim. Methods of determining the oil content from samples of 0.25 to 2 grm. of triturated seed have now been perfected and one person can make 80-90 analyses a day. The oil content of lupin seeds has been raised by selection from 8.9% to 12.2% in 7 years, and still further increases are expected from crossings of the best forms. Wheats combining high yield and content and quality of gluten have been obtained in crossings between a German wheat N. 3.890₃₀ (Peragis x Hohenheimer) and varieties such as Marquis and Lin Calel. For fibre analysis, stems are boiled for an hour in caustic potash, the fibres are separated and then boiled for an hour in Persil; using this method the fibre content of hemp was raised from 12-15% in 1936 to 17-20% in 1940. By crossing the Seeländer flax with Rumanian linseed, selections with 38-39% of oil and 20-22% of fibre, 70cm. in length, have been obtained.

1108. HONECKER, L.

575:633(43)

633-2-1.521.6(43)

Aufgaben der Pflanzenzüchtung in der Kriegs-, und Nachkriegszeit. (**Tasks of plant breeding in the war and post-war period.**)

Prakt. Blätter Pflanzenbau u. Pflanzenschutz 1941/42 : 19 : 142-64.
(From Z. PflKrankh. 1943 : 53 : 142-43.)

Though few modifications have been necessary in plant breeding aims for Germany under war conditions, as a result of economic changes, resistance to lodging, to shedding, to cold and to various fungous diseases has acquired very considerable importance. By hybridization strains of barley have been produced combining resistance to *Puccinia glumarum* and *Erysiphe graminis*. Breeding for resistance to *P. simplex* is more difficult owing to the numerous races of the fungus. But by crossing a resistant four-rowed spring barley from South America with a two-rowed resistant form hybrids have been obtained which are now being back-crossed to yellow rust and mildew resistant malting forms, in hopes of combining in one variety resistance to all three diseases.

As regards the production of wheat and barley varieties resistant to loose smut, the prospects are not promising except in the case of spring wheat for which a plan, suggesting selection from the progeny of crosses of commercial varieties with resistant strains hitherto of no practical use, is outlined.

In 1941 three new strains of potatoes resistant to *Phytophthora infestans* were bred. Now, the aim should be to obtain varieties resistant also to early and late frosts, drought, virus disease and Colorado beetle.

1109. PIRES, D. R. V.

575:633(46.9)

Em busca de novas raças de plantas. (**In search of new races of plants.**)
Rev. Agron. Lisboa 1942 : 30 : 153-75.

Seed of cereals grown in the Elvas region is known to produce better crops in many places as compared with seed of the same variety grown locally; this is ascribed to natural selection occurring in the rigorous Elvas climate. It was decided for this reason to concentrate cereal breeding at Elvas. A large collection of cereal varieties from different parts of the world was established, wheat, barley, oats and rye being included. Similar collections of forage crop varieties were also made.

Careful observations have been made throughout the vegetative season on the plants in the collection and on a number of hybrids that are also under investigation. Inferior plants have been discarded and especially promising ones selected for propagation. In 1937-8 as many as 8744 wheat plants were under observation; 112 crosses were made, seed being obtained from 93 of them. Special attention was devoted to the selection of suitable forms of spring wheat. Among the pasture plants 337 annual forms and 61 perennial forms were subjected to the same type of observation and selection.

In 1938-9 the work was continued on the same lines. Careful selections were made in the F_4 generations of the hybrids and a number of F_4 and F_5 selections were included in comparative tests. A further 75 wheat crosses were made, of which 59 set seed. Breeding work with rye was also started, both inbreeding and mass selection being employed. The unusual lack of rainfall made it possible to effect a rigorous selection for drought resistance in the herbage plants.

In 1939-40, 35 further cereal crosses were made, 29 of which were successful; the number of wheat hybrids under observation, ranging from F_1 to F_8 , amounted to 300, comprising 3240 different plants. Statistical plot tests were made with a number of F_6 and F_7 hybrids. Selection for resistance to *Puccinia glumarum* and *P. graminis* was effected during a severe epidemic of these parasites. A start was made with oat breeding and a bad attack of *P. coronifera* made it possible to select for resistance; 5 of the 40 varieties considered as possible parents proved to be resistant; of the full collection of 469 varieties 27 were resistant. Inbreeding and mass selection was continued with rye; the protein and starch content of the barley collection, comprising 281 varieties, was determined and inbreeding work with maize was begun. The work with herbage plants was continued, sorghum being found specially promising as a source of green fodder; certain lines with very low hydrocyanic acid content have been selected. The effect of manuring and tillage upon the wild herbage flora was studied.

1110. NILSSON-LEISSNER, G.

575:633(48.5)

575:633.2/3(48.5)

Foderproduktionen i Sverige. VI. Resultat av växtförädlingen. (**Fodder production in Sweden. VI. Plant breeding results**).

Nord. JordbrForskn. 1941 : 23 : 178-80.

The best among old local strains of herbage plants grown in different parts of the country and found to have gradually become specially adapted to the climate and soil by natural selection have been multiplied and distributed within their special districts.

Oats and barley for fodder have been improved in quality, yield (nearly 15% increase), earliness, stiffness of straw, disease resistance and varietal uniformity. Special varieties of fodder peas and legumes for green fodder and for harvesting when ripe for various purposes and in different districts have been used in reclaiming large areas. Fodder root crops have been bred specially for larger yield, greater uniformity, higher dry matter content (which should ensure better storage properties) and for resistance to cold and disease (e.g. club root). Breeding red clover and alsike for various regions for high yield and persistence has produced the red clovers Merkur and Resistenta; for white clover rapid and good tillering capacity combined with some drought resistance is also required and Svea, Hero and Robusta have been released to meet these needs. Some very promising winter-hardy and persistent lines of blue lucerne with a good seed production even under Swedish conditions have been discovered in multiplying up certain lines.

Twelve improved strains of legumes were released during the year by Swedish breeders; four were however subsequently recalled and replaced by better forms.

The main aim in breeding grasses for hay has been high yielding leafy and persistent types with a rhythm of development suited to cultivation in different localities with late, medium late and early red clover or blue lucerne. Some good types have been produced and similar successes are recorded in regard to improvement of pasture grass and of *Poa pratensis* and *Festuca rubra* in particular.

Efforts have also been directed to encouraging the cultivation of smooth brome grass and reed canary grass, in permanent leys, with conditions suitable for these drought resistant and hygrophilic species.

Among the new crops that have been introduced were sweet lupins, early varieties of maize and some oil plants.

1111. NOLLA, J. A. B. 575:633(72.95)
 Annual Report of the Agricultural Experiment Station, University
 of Puerto Rico, for the fiscal year 1939-1940 : Pp. 66.

Information relating to the following crops is included in this report.

Cotton

A new line of Sea Island cotton is being developed.

Sugar cane

C-1-69 is reported as a promising new strain.

Pepper (Capsicum)

The native variety "ajé picante" is being used for hybridizing; it is resistant to mosaic disease.

Egg plant

Two new varieties resistant to bacterial wilt are being introduced: E-12, a good quality type with pink fruit, and Puerto Rican Beauty, also of high quality but with dark purple fruit.

1112. 575:633(72.95)
 633-2-1.521.6:575.127.2(72.95)

Annual report of the Agricultural Experiment Station, Puerto Rico
 1940-1941 : Pp. 70.

The report includes accounts of the following economic plants.

Maize

F_1 data suggest that a new mutant (*Bm-b*) for brown mid-rib and tassel is very closely linked to the red pericarp gene (*P_r*) of the first chromosome.

Cotton

Two new strains of Sea Island cotton are being introduced; these are early maturing types which shed only slightly and have silky lint and uniform strong fibre with an average length of 2 inches.

Sugar cane

Intergeneric hybrids have been made between *S. officinarum* and *Erianthus* sp. and inter-specific crosses have been obtained between *S. robustum*, *S. spontaneum*, *S. sinense* and *S. officinarum*. Two promising intervarietal crosses are being developed: M-28 x P.O.J. 2878 and D1-6 (P.O.J. 2364 x St Croix 12/4) x P.O.J. 2878.

Pepper (Capsicum)

An apparently undescribed mosaic disease attacks commercial varieties of pepper. A cross between one of these varieties and a resistant native species has suggested that resistance is controlled by a single gene. Resistant F_2 segregates have been obtained.

Mango

Three promising native selections are being investigated: Cubano, Larrauri and Manzano.

Beans

White selection No. 209 and rose selection No. 785 are being introduced; they both outyield standard varieties.

1113. JARDINE, J. T.,
 FROMME, F. D. and
 KNIGHT, H. L. 575:633(73)

Report on the Agricultural Experiment Stations, 1940.

U.S. Dep. Agric., Washington, D.C. 1941 : Pp. 272.

Reports are given on the production of improved varieties of cotton, flax, potatoes, tobacco, sugar beet, sugar cane and ground-nuts, and a number of cereals, legumes, fruits and vegetables.

1114. 575:633(74.2)

Agricultural research in New Hampshire.

Bull. N.H. Agric. Exp. Sta. 1942 : No. 345 : Pp. 69.

Information relating to the following crops is included in this bulletin:—

Forage plants

Ten families of red clover characterized by a perennial tendency are being used in hybridization experiments. Crosses have been obtained from ladino clover x native white, ladino x New

Zealand and ladino x S-100; the progeny obtained had the required degree of leafiness but were not large enough. A clone of smooth brome grass with a creeping tendency is being propagated.

Alfalfa

Varieties A-145, N.U.; A-67, N.J.; A-68, Mich.; and A-69, Mich. did well in field trials.

White pine

A survey of New Hampshire races of pine is proposed in order to select for rapid growth, narrow crown and small branches.

Strawberry

Several wild varieties, including a perfect-flowered form, have been selected for hybridizing with cultivated varieties. It is hoped by this means to introduce the characters of winter-hardiness, drought resistance and late maturity to commercial types.

Tomato

The performances of three recent varieties are being investigated. New Hampshire Victor is a selection from Victor but more resistant to disease. Orange King is so called from the colour of the flesh and Home Garden is an extremely early variety with small fruit of good quality.

Musk-melon

Two strains have been developed, one characterized by extremely early high quality fruit and the other by perfect flowers.

Beans

A white-seeded green bean with small pods is being developed for canning requirements.

1115.

575:633(74.5)

Fifty-Third Annual Report Rhode Island State College Agricultural Experiment Station.

Kingston, R.I. 1941 : Contr. 586 : Pp. 71.

Fifty-Fourth Annual Report Rhode Island State College Agricultural Experiment Station.

Kingston, R.I. 1942 : Contr. 614 : Pp. 62.

The 53rd report contains the results of varietal tests undertaken with plants such as maize, potato, celery, tomato, beet, cabbage, pea, bean, onion and egg plant.

Egg plant crosses made at the station have resulted in some promising types. Additional selections were made for disease resistance and from the standpoint of commercial fruit possibilities.

The genetical investigations on the genus *Rubus* have been completed. During the work a blackberry variety named Austin Thornless was found to cross and self satisfactorily and to transmit its character of thornlessness. Two selfed seedlings of this variety which have fruited, appear to be especially promising; further tests will be made.

In the 54th report it is stated that the maize and vegetable varietal trials were continued and further promising blight (*Phomopsis vexans*) resistant egg plant selections, were obtained.

1116.

575:633(74.7)

LADD, C. E. 633-2-1.521.6:581.6:575.12(74.7)

55th Annual Report of the Cornell University Agricultural Experiment Station 1942 : Pp. 192.

Red clover

A tetraploid line is being developed which is more vigorous than the diploid and it is hoped that it will show a greater tendency towards a perennial habit.

Potato

Satisfactory lines have been obtained from the cross Russet Burbank x Katahdin.

Rubber substitutes

New plants have been examined for rubber and a new microtechnique for rubber-detection (not however distinguishing between rubber and resin) has been devised. *Taraxacum kok-saghyz* is being subjected to field trials and attention is being paid to the question of susceptibility to diseases.

Cabbage

Breeding for resistance to yellows has been simplified by the elaboration of a technique for determining susceptibility in winter. Several strains of Glory and Danish and one of Succession are resistant.

Lettuce

No. 456 is a new variety resistant to tip-burn which heads well in hot weather. It is a selection from Brittle Ice x Imperial 152.

Celery

Cornell 6 and Cornell 19 are two new high quality varieties combining self-blanching with resistance to *Fusarium* yellows.

Kidney bean

The cross Red Kidney x Scotia has given rise to plants tolerant to bacterial blight.

Sweet corn

Seneca 60-13, a selection from Seneca 60, resembles the latter but has larger ears.

1117. CORBETT, R. B. 575:633(75.2)

Science at work for the farmer.

54th Ann. Rep. Md Agric. Exp. Sta. 1940-41 : Pp. 70.

Brief accounts are given in this report of the improvement by breeding of plants such as sweet corn, maize, soya bean, potato, tobacco, cantaloupe, strawberry and apple, together with the testing of a number of new varieties for adaptation to growth in the state. Some of the important results of this work are as follows: crosses with an inbred strain of sweet corn, developed for Maryland conditions, have given an average yield of 17% more than that of the best commercial strains or hybrids available; tobacco investigations up to the present have resulted in strains resistant to mosaic, others resistant to root rot and one very resistant to fusarium wilt; a new hybrid cantaloupe has been developed which has a higher sugar content, sets more fruit and is much less susceptible to ground-rot cracking than Hale's Best.

It is stated that genetical investigations are being carried out with the genera *Gladiolus* and *Tulipa* with the aim of obtaining information which might be applied to breeding work in general.

1118. SYMONS, T. B. / 575:633(75.2)

Twenty-sixth Annual Report of the University of Maryland Extension Service for the year 1940 : Pp. 87

The work carried out by the "Extension Service" included demonstrations of varieties of a large number of economic plants superior for different qualities such as yield, disease resistance, time of maturity and suitability for commercial distribution.

1119. 575:633(75.6)

' 633.16-2.45-1.521.6

633.51:581.6:575

Research and farming 1941.

64th Ann. Rep. N.C. Agric. Exp. Sta. 1941 : Pp. 83.

During the year covered by this report varietal tests have been carried out with many plants such as maize, oats, wheat, groundnuts, tobacco and potatoes.

Several new varieties of economic plants have been developed and these include a fertile triple cotton hybrid possessing fibres which are superior to those of its Upland parent in strength, fineness and uniformity; Sunrise, a high yielding grain and forage winter barley, resistant to mildew (*Erysiphe graminis Hordei*) and to several races of covered smut (*Ustilago Hordei*) and black loose smut (*U. nigra*) but susceptible to brown loose smut (*U. nuda*); and a tobacco variety resistant to black shank (*Phytophthora*).

1120. WATKINS, D. W. 575:633(75.7)

Farming for victory.

Rep. Dir. Co-oper. Ext. Wrk S. Carolina, U.S.D.A. 1941 : Pp. 156.

The report mentions the ways in which the Extension Service has aided in the improvement of the cotton, maize, tobacco, oats, barley, wheat, potato, peach and other crops, in S. Carolina.

A. C. S.

1121.

575:633(75.8)

STARR, S. H.

633.00.14(75.8)

Twenty-first Annual Report 1940-1941.

Bull. Ga Coastal Plain Exp. Sta. 1941 : No. 32 : Pp. 139.

Varietal tests have been made with the following crops: cotton, maize, peanuts, oats, wheat, rye, soya beans, water-melons, lima beans, asparagus, peaches, pecans, pears, grapes, figs, jujubes, blueberries and citrus fruits. The corn-belt maize hybrids have given low yields and are susceptible to weevil attack but the hybrid Florida W-1 has been satisfactory. A wilt-resistant water-melon strain S87-17S is also proving valuable.

1122.

MILLER, M. F.,

SHIRKY, S. B. and

575:633(76.2)

L'HOTE, H. J.

633-2-1.521.6:576.356.5:581.04(76.2)

Work of the Agricultural Experiment Station during the year ending June 30, 1939.

Bull. Mo. Agric. Exp. Sta. 1942 : No. 444 : Pp. 106.

Reports on the following economic plants are presented:—

Wheat

Breeding for resistance to leaf-rust and loose-smut has continued.

Polyploids have been examined cytologically. A haploid ($1n = 3x$) plant of Chinese spring wheat (*T. vulgare*) produced thirteen plants, which included normal ($2n$), monosomic ($2n-1$), trisomic ($2n+1$) and reciprocal translocation types. Each line was continued to the third generation and it was found that translocations and trisomic types were not appreciably different from the normal either in morphology or fertility. Two different trisomic lines gave rise to tetrasomics ($2n+2$) indicating that duplications can be transferred through the pollen. On selfing the monosomic types, 5-90% monosomic offspring were produced and 0-20% "nullosomic" ($2n-2$) types. The forms showed external differences and one of the "nullosomic" plants was asynaptic at metaphase in the pollen-mother-cells.

Eight successful crosses were made between these trisomic and "nullosomic" plants and *T. durum*; it was found that the deficiencies occurred five times in either the A or B chromosome set and 3 times in the C set. Some of these *durum-vulgare* hybrids were back-crossed to *T. durum* in order to produce monosomic plants of this species.

No success was achieved in the attempt to produce haploid plants from the use of heavily X-rayed pollen. The partially asynaptic "nullosomics" produce viable pollen and ovules, some with additional deficiencies.

A cytological study of the sterile hybrids formed by crossing species of the genera: *Triticum*, *Aegilops* and *Haynaldia* revealed a considerable range in pairing behaviour; 0.32 univalents per microsporocyte were found in *Ae. speltoides* x *Ae. sharonensis* and 11.56 in *T. aegilopoides baidaricum* x *H. villosa*. Five of these hybrids were obtained as fully fertile amphidiploids by use of colchicine, viz. *T. monococcum* x *Ae. uniaristata*, *Ae. caudata* x *Ae. umbellulata* and *Ae. speltoides* x *Ae. umbellulata*. The hybrid obtained from crossing hexaploid wheat with the wheat-rye amphidiploid was back-crossed with the latter in an attempt to produce new intermediates between wheat and rye.

Maize

The genetic effects of X-ray and ultra-violet treatments are discussed. Experiments with monochromatic radiations at 2,000 ergs/mm.² showed an optimum effect at 2537 λ , the effect diminishing rapidly on either side of this figure. An increased dose was effective over a wider range of wave-length. Doses of more than 1,000,000 ergs/mm.² were ineffective at 3130 λ .

Oats

Hybridization for smut resistance involving the varieties Columbia and Fulghum has been continued.

Barley

Varietal tests are reported.

Soya bean

Lines from the cross Virginia x S.P.I. 37062 are giving promising yields. Morse and Virginia have shown varietal differences when grown in culture solutions.

Cotton

Varietal tests are reported.

Tomato

Hybrids between *L. pimpinellifolium*, a species very resistant to *Fusarium* wilt, and cultivated varieties have shown that resistance behaves as a single dominant factor. Back-crossing the hybrid with susceptible varieties gives a 1:1 segregation for resistance. Less than 25% of the progeny from selfing showed susceptibility and it is suggested that resistance may be linked with increased vigour of pollen-grains. The susceptible segregates gave rise to some progeny with partial resistance and it is possible that *L. pimpinellifolium* contains other resistance genes than the main one.

1123.

575:633(76.4)

CONNER, A. B.

633-2-1.521.6:576.3:575.12(76.4)

Fifty-fourth annual report of the Texas Agricultural Experiment Station, 1941 : Pp. 202.

Details relating to the breeding of a large number of Texas crops are given; some of the more important results are as follows:—

Two new varieties of oats are being released, Rustler and Ranger, the latter being a selection from the cross Nortex x Victoria (cf. "Plant Breeding Abstracts", Vol. XI, Abst. 960).

Field tests have shown that Texas maize hybrids outyield both open-pollinated varieties and hybrids from other states; they are however rather more susceptible to ear-worm infection. A study of chromosome morphology shows that the number of knobs on the chromosomes is greatest in maize from Guatemala and decreases almost linearly with distance from there; fewest knobs are found in Ecuador. Teosinte (*Euchlaena*) has more knobs than any variety of maize (*Zea*) and is abundant in Guatemala where the two hybridize freely. It is suggested that maize might have acquired its chromosomal knobs by crossing and that the character has then spread concentrically from Guatemala, the zone of hybridization.

Several new dwarf sorghum varieties suitable for combine harvesting have been introduced. Caprock (No. 7000-3) and Plainsman (No. 7005) are selections from the cross Kafir x Milo; they are resistant to *Pythium* root rot and moderately resistant to chinch-bug. Bonita is a selection from crosses between Feterita, Kafir, and Hegari and is an early dwarf form. The variety Darso includes two strains, one resistant and the other susceptible to *Pythium*; both are almost immune to chinch-bug. Sooner Milo No. 8 is also resistant to root rot. Several so-called adaptive genes have been discovered in the genus. The distinction between early and late maturation depends on a single gene; in some cases earliness is dominant and in others lateness. Milo and Sooner Milo differ by a dominant gene which determines late maturation in Milo. This distinction however is only maintained under normal conditions; when the two varieties are grown together experimentally in a ten-hour day they mature at the same time. Also, both Milo and Sooner Milo cross with Blackhul Kafir and the offspring formed show hybrid vigour in which one type is twice as vigorous as the other. These examples of gene activity initiated by particular conditions may be of use in attempting to understand heterosis. Male-sterility controlled by a single recessive gene has been found in Texas Blackhul Kafir. This is not the same gene as that discovered at Coimbatore in the variety Durra; the interaction between the two genes has been studied. A recessive gene determining liguleless leaves is also reported; it is linked to the compact panicle gene with a cross-over value of 8.5%.

Cotton breeders have had some success in transferring the factors determining resistance to angular leaf spot from Asiatic to American Upland varieties. Some haploid varieties of cotton have been obtained, one from the use of X-rayed pollen, and these have had their chromosomes doubled to produce pure lines. Two types of wilt resistance can be distinguished; Coker 4-in-1 str. 4 is resistant even when infested with root-knot but Miller 610 shows a considerable increase of susceptibility under such conditions.

Field trials with flax have demonstrated the extreme resistance to rust of the variety Rio. Work has been continued with interspecific *Citrus* crosses. A new tangelo (52018K12G) with unusually large fruit has been obtained. Some types of citrange and citrumelo have produced non-segregating seedlings which are presumed to have arisen by nucellar budding.

A desirable plum cross has been made between Munson and Santa Rosa. Complete self-sterility has been observed in the variety Bruce; it is presumed that this is fertilized in orchards by wild species, e.g. *P. angustifolia*.

Twenty acorns have been obtained from a cross between *Quercus virginiana* and *Q. lyrata* and one acorn from the cross *Q. virginiana* x *Q. serrata*.
A number of tomato mutants producing abnormal growth forms have been observed. Selections from the cross Marglobe x Rutgers are proving almost immune to wilt.

1124.

575:633(76.6)
635.656-2.4-1.521.6

Science serving agriculture.

Bienn. Rep. Okla. Agric. Exp. Sta. 1942 : Pp. 92.

The report presents summaries of the results of the station's experimental work, which included varietal tests on a number of economic crops and the production of improved strains of plants such as cotton, wheat, barley, sorghum and potato.

The two new pea varieties Glacier and Teton give double the yield of Alaska; they have superior quality and are wilt-resistant.

1125.

575:633(76.8)
633-2-1.521.6:575.12(76.8)

Fifty-fourth annual report of the Agricultural Experiment Station of the University of Tennessee, for 1941.

Knoxville 1941 : Pp. 100.

A considerable amount of information relating to Tennessee crops is included and the following points require mention:—

Wheat

Two new varieties have been released: Bluestem 2, a high yielding, beardless, Purplestraw type which however is unsuitable for infertile soils and Fulcaster 612 which resembles Fulcaster in most respects but gives a higher yield.

Oats

Promising yields have been obtained from selections of the crosses Tenn. 090 x Victoria, Forkedeer x Victoria, Fulwin x Victoria and Tennex x Bond.

Barley

The new variety Jackson (smooth-awn B5-9) has been released; it is winter-hardy, yields well and is adapted to upland soils of low fertility.

Maize

The results of varietal tests are recorded.

Forage grasses

Selections have been made for drought resistance.

Red clover

Inbred lines resistant to anthracnose and powdery mildew have been continued.

Cotton

It has been found that varietal resistance to wilt (*Fusarium*) is more precisely estimated from the number of plants killed than from the number affected. Although strains of the fungus have been isolated with varying degrees of virulence no differential resistance by the varieties to these strains has been observed. Coker 4-in-1 came out best in varietal tests for wilt resistance and crossing has been effected between wilt resistant varieties and upland cotton strains.

Tobacco

Lines of Burley tobacco resistant to mosaic and suitable for hybridization are being developed. Some high yielding strains, resistant to black root rot are also receiving attention.

Pear

Seedling 34 S377 obtained from the cross Late Faulkner ♀ x Duchesse D'Angoulême ♂ was found to be resistant to leaf-spot and fire-blight. In a back-cross to Duchesse D'Angoulême, these characters behaved as recessives.

Red Raspberry

All crosses involving Preussen were susceptible to leaf-spot.

Sib-crosses carrying $\frac{1}{8}$ *Rubus Kuntzeanus* are showing good commercial quality.

Strawberry

• Tennessee seedling No. 230, a selection from the cross Missionary ♀ x Premier ♂, matures very early and transmits this character in some degree to its progeny. Strains are being selected for resistance to root rots.

Water-melon

The wilt resistant varieties: Hawkesbury, Wilt Resistant Klondike and Leesburg, have been crossed with commercially desirable but susceptible varieties.

Tomato

Hybrids have been obtained from crossing cultivated varieties with foreign species resistant to leaf-spot defoliation.

Beans (*Phaseolus*)

A cross has been made between Asgrow Stringless Green (*P. vulgaris*) ♀ and Urd (*P. mungo*) ♂. The latter species is tolerant of the Mexican bean beetle and transmits this character to the hybrid. Promising selections made from the progeny of this cross have been carried to the F_4 stage. The reciprocal cross was unsuccessful.

Sweet corn

Comparative tests have been made between Tennessee Sweet Hybrid and Golden Cross Bantam.

1126. CORNS, J. B.

575:633(77.3)

Results of 1940 field trials in central and northern Illinois.

Trans. Ill. Hort. Soc. 1940 : 74 : 301-10.

In the Northern Illinois trial of sweet corn hybrids the most productive hybrid and the earliest in time of maturity was Golden Treasure; Ioana gave the highest yield and Topcross Sunshine matured earliest in a similar trial in Central Illinois.

The standard cabbage variety Bugner was compared with the new "yellows" resistant strains of Bugner. The new strain appeared to be promising and may prove suitable where a resistant late maturing variety is desired.

1127.

575:633(77.7)

Report on agricultural research for the year ending June 30, 1942.

7th Rep. Ia Corn Res. Inst. Agric. Exp. Sta. 1942 : Pt I : Pp. 293.

Accounts of the following crops appear in this report:—

Wheat

Lines from Minhardi x Iobred are being selected for quality and resistance to rust and Hessian fly. Pilot is proving a good disease resistant spring wheat.

Maize

Strains of *Phytoponas Stewartii* (bacterial wilt) have been irradiated with X-rays. A number of morphological and physiological variants were produced similar to those arising spontaneously in culture. It is thought that these induced variations are homologous with the mutations of higher plants; variation is discontinuous and no intermediates between the original type and the variants were found.

Barley

Promising disease resistant lines are being developed from Velvet x Trebi.

Oats

Selections from D69 x Bond are proving very resistant to crown-rust and halo-blight. During a rust epidemic, they outyield other varieties but in seasons when rust-infection is only moderate, the maximum yields are obtained from Boone, Marion and Tama. Details of the distribution of physiological races of crown-rust are given.

Forage grasses

Lines of *Bromus inermis* are being inbred; no decrease in self-fertility was observed in the F_1 . *Elymus canadensis*, a useful grass for soil conservation projects, is very variable in the native state and self-fertility is very low. It is being selected and inbred in order to improve its quality.

Leguminous forage plants

A promising F_2 has been obtained from a cross between a late sweet clover variety resistant to stem blackening and Pioneer, an early form with low coumarin content. The F_1 of *Melilotus*

alba x *M. suaveolens* is highly sterile. Tetraploid sweet clover is showing some desirable agronomic characters; cross-fertility exceeds self-fertility. A self-fertile red clover line has been crossed with Zofka, a variety with short corolla tubes; it is hoped that homozygous lines with short corolla tubes will be obtained suitable for breeding experiments. Alfalfa is being bred for wilt resistance. An early disease resistant strain of Lespedeza is being multiplied for seed distribution.

Potato

Selections and hybridizations are being made in the attempt to produce early varieties resistant to hopper burn.

Sweet potato

Some of the lines obtained from Porto Rico x Nancy Hall have good storing qualities and an improved potato form.

Soya bean

Lines from Dunfield x Richland are showing a combination of high yield with resistance to lodging.

Rubber substitutes

Apocynum cannabinum has a rubber content of less than 2% early in the season. Individual plants differ much in rubber content.

Melon

The progeny of Hawksbury x Early Market Queen are being selected and back-crossed in order to obtain lines combining good quality with resistance to wilt and anthracnose.

Tomato

The growth rates of diploid and polyploid forms of pure lines of *Lycopersicon esculentum* and *L. pimpinellifolium* have been compared.

Apple

Some stocks, e.g. Dudley, appear to cause dwarfing in their scions. Since there is some correlation between dwarfing and winter-hardiness, these stocks may be worth developing. Winter-hardiness also appears in many of the progeny derived from Delicious; reciprocal crosses of Jonathan x Delicious are very unequal in this respect.

Peach

Winter-hardiness has been found in the progeny of crosses involving *Prunus Davidiana*.

Raspberry

Three black raspberry varieties, No. 77, No. 20 and No. 51 have been selected from Black Pearl x Quillen. They are winter-hardy and resistant to anthracnose; the first variety is an early type and the other two late.

Onion

Scott County Globe was crossed with White Persian, a thrips resistant variety. A correlation was found between resistance and thickness of epidermis; the F₁ showed very little resistance.

1128.

575:633(78.1)

633-2-1.521.6:575

CALL, L. E.
Tenth Biennial Report of the Director of the Kansas Agricultural
Experiment Station for the Biennium July 1, 1938 to June 30,
1940 : Pp. 159.

An immense amount of information relating to the breeding of economic plants for Kansas is summarized in this report. Amongst other items, the following may be mentioned.

Two promising new varieties of wheat, Oro x Tenmarq C.I. 11673 and Kawvale x Tenmarq C.I. 11669 have given satisfactory yields. It has been found that in some cases resistance to leaf rust is recessive in seedlings and dominant in adults; only a single factor is involved in contrast to stem rust, which is controlled by two factors dominant for resistance and unlinked to the leaf rust resistance gene. The variety Marquillo is resistant to Hessian fly and at least three genetical factors appear to be involved; there are probably two physiological races of the fly. Six races of Tilletia have been detected in Kansas and some details of rust races are also given. Breeding wheat for all these diseases and for loose smut is in progress.

Oats are being bred for resistance to the two races of *Ustilago laevis* and the six races of *U. Avenae* known to be present in the state. Resistance to stem and crown rust is also being

studied. Maize varieties resistant to smut and *Diplodia* and Sorghum varieties resistant to smut and chinch-bug are being developed.

The best yielding alfalfa variety is Ladok and new strains resistant to bacterial wilt are being produced.

It is hoped that a new, high yielding, mosaic resistant cucumber will be found in the progeny of the cross Chinese Long x Double Yield.

1129.

575:633(78.1)

Eleventh Biennial Report of the Director 1940-42 of the Agricultural Experiment Station, Kansas 1942 : Pp. 79.

Much of the work on breeding mentioned in this paper has already been reviewed in "Plant Breeding Abstracts". The following are some of the points of interest which have not been reviewed before: two new varieties of hard red winter wheat are reported, Comanche (C.I. 11673), a selection from the cross Oro x Tenmarq, with a high yield, high resistance to leaf rust and other good qualities, and Pawnee (C.I. 11669), a promising selection from the cross Kawvale x Tenmarq; of a number of maize hybrids introduced into Kansas and tested to determine those suitable for growth in the state, U.S. 13, U.S. 35, Ill. 200 and K.I.H. have been approved; Kansas-2234 and Kansas-2216, white dent maize hybrids, Kansas-1583 and Kansas-1585, yellow dent hybrids, and Kansas-24 x 30A and Kansas-18 x 24, popcorn hybrids, have all given a better performance than the better open-pollinated varieties and hybrids developed outside the state; thirty-four new oat strains with resistance to crown rust, and selected from the crosses Fulghum-Markton x Victoria-Richland and Fulton x Victoria-Richland all outyielded the variety Kanota; new strains of flax showed an average yield of 2.0 bushels per acre higher than Linota, the leading variety in the flax area of Kansas.

1130.

575:633(78.2)

BURR, W. W.

633-2-1.521.6:575.12(78.2)

Fifty-fifth Annual Report of the Agricultural Experiment Station of the University of Nebraska College of Agriculture 1942 : Pp. 96.

This report contains the results of varietal tests made with a number of economic crops. It was found that maize hybrids gave a higher yield than varieties. A new winter wheat, Pawnee, line C.I. 11669, derived from the cross Kawvale x Tenmarq has a high yield and matures early. Kearney, a high-yielding spring wheat resistant to Hessian fly but susceptible to rust has been crossed with the variety Hope and breeding is now at the F₆ stage. C.I. 3314, a high-yielding variety of oats, is a selection from the cross Victoria x Richland. Sorghum strains are being selected for resistance to chinch-bug. Field tests with soya beans have placed Dunfield and Illini as the best varieties for Nebraska. Hybrid vigour is very marked in alfalfa and the self-sterility that develops during inbreeding is useful for hybridizing experiments. It is suggested that observation on differential rabbit grazing is a useful technique for selecting non-bitter strains of sweet clover. Red spire is the most highly shatter resistant variety of castor bean in the state. Potato varieties B4-1 and B5 are moderate yielders, come out well in cooking tests and have a considerable resistance to *Fusarium* wilt. Two promising crosses of tomato have been made: All Red x Stokesdale and Danmark x Break-o-Day.

1131. MCKEE, C.

575:633(78.6)

Serving Montana agriculture through research.

46th and 47th Rep. Mont. Agric. Exp. Sta. 1938-1940 : Pp. 67.

A number of varieties of crop plants have been tested at the main station and branch stations for adaptation to Montana conditions and recommendations have been made. The crop breeding work carried out by the station included the production of a new barley variety, Composite Cross C.I. 5438, which possesses, together with other good qualities, more resistance to grasshopper attack than any of the present barley varieties recommended for Montana; and the selection of a strain from the cross between the oat varieties Markton and Victory, which is equal to its parents in yield and resistance to lodging and is resistant to smut and halo blight.

1132. CLARK, R. T.

575:633(78.6)

Value of agricultural research in wartime.

48th and 49th Rep. Mont. Agric. Exp. Sta. 1940-1942 : Pp. 63.

Some of the work connected with plant breeding mentioned in these reports has been reported in separate bulletins. (Cf. Absts 1195 and 1231).

The following are a few of the new points of interest: a selection of a cross of Ridit x Utah Kanred winter wheat was introduced from Utah and found to be resistant to a type of stinking smut; several selections from Great Northern bean plants growing in the state have remained free from mosaic disease and have produced greater yields than the selections which were introduced from Idaho in the past; station varietal tests have shown that the sweet corn variety Spancross is of high quality and matures earlier than some of the varieties grown in Montana and that the tomato variety Harkness is one of the earliest to ripen and one of the heaviest yielders with a minimum of cracking.

1133. HILL, J. A. 575:633(78.7)
Fifty-first Annual Report of the University of Wyoming Agricultural Experiment Station 1940-1941 : Pp. 47.

The report contains brief statements of the results of varietal tests with barley, hybrid maize, winter wheat, potato, raspberry and other plants.

A. C. S.

1134. 575:633(79.2)
633-2-1.521.6(79.2)

Agricultural research in Utah.

Bull. Utah Agric. Exp. Sta. 1942 : No. 306 : Pp. 110.

Reports on the following crops are included:—

Wheat

Six races of covered smut, three of which are common, have been detected in Utah. A selection from Relief x Ridit is resistant to all of these races. It has been found that varietal resistance to different physiological races may vary with the locality. Five races of loose smut are known in the state.

Barley

Further selection of the variety Velvon has produced lines with improved yield and straw strength combined with resistance to loose and covered smut. This variety is being back-crossed in the attempt to incorporate into the phenotype a well-feathered style; it is hoped that this would reduce sterility.

Forage grasses

Bromus inermis is being selected for high productivity. Inbreeding experiments have shown a considerable decrease in vigour in all lines together with a decrease in self-fertility and a tendency for segregation of chlorophyll deficiencies and other abnormalities. The degree of sterility also showed a tendency to segregate. A selection of *Agropyron trachycaulum* is showing a combination of high yield with superior drought resistance.

Alfalfa

Two new wilt resistant strains are reported: A-126 and 262-10.

Tomato

The wilt-resistant variety, Peruvian wild, has been crossed with Stone and Century; the hybrids produced fruit of commercial size but back-crosses and out-crosses did not retain wilt resistance. Strains of Ojo de Venado and Red Peach resistant to curly top have been crossed with Stone Baltimore and Century; selections from the hybrids have produced fruit of commercial quality but the degree of resistance was much reduced. Almost immune strains of *L. glandulosum*, *L. peruvianum* var. *humifusum* and *L. peruvianum* var. *dentatum* have been crossed with a strain of *L. esculentum* x *L. hirsutum*; unfortunately the hybrid is almost completely sterile.

Plum

A cross between Methley and Wickson has combined hardiness with a fruit quality suitable both for preserving and freezing.

1135. BESSE, R. S. 575:633(79.5)
Oregon's agricultural research aids national defense.

Bienn. Rep. Agric. Exp. Sta. Oregon 1938-40 (1941) : Sta. Bull. 401 : Pp. 92.

Brief mention is made of the investigations carried out on the breeding and varietal testing of cereals, fruits and vegetables, during the two years covered by the report. While much of this work is still in progress, many positive results have been obtained, of which the following

are a few examples: new high yielding cereal varieties have been produced; good quality selections have been made from crosses between blackberries and loganberries; selection from a White Bliss potato has resulted in a strain which is superior to the old variety in productivity and disease resistance; and curly top resistant bean and squash varieties have been obtained.

A. C. S.

1136.

575:633(79.6)

High lights in agricultural research in Idaho.

49th Rep. Univ. Idaho Agric. Exp. Sta. 1941 (1942) : Bull. No. 244 : Pp. 63.

This report contains information about the following crops:—

Wheat

Elgin is a new variety of white club winter wheat. It is a selection from Forty Fold x Hybrid 128 and resembles Mosida, having however a stiffer straw. A disadvantage is its extreme susceptibility to bunt. Some promising rust-resistant lines of spring wheat have been obtained from back-crossing the progeny of Lemhi x Hope four times to Lemhi.

Oats

Selections from Bannock x Victoria Richland are showing resistance both to stem rust and smut.

Maize

Hybrids are being produced from selected crosses derived from 150 inbred lines.

Alfalfa

This crop is being selected for resistance to bacterial wilt.

Apple

Idared is a new variety derived from Wagener x Jonathan; it has bright red fruit of good flavour.

Tomatoes

Selections from Bison x (Marglobe x *Lycopersicon chilense*) are showing resistance to curly top.

Beans

Selections of pinto beans resistant to curly-top and mosaic have been obtained from Pinto x Red Mexican U.I.34.

Peas

Defective germination of peas in Idaho has been caused by the presence of bacteria within the seeds. The bacteria are differentiated into a number of physiological races (some spore-formers) and considerable variation in the susceptibility of pea varieties has been observed; Alaska is particularly resistant.

1137. DELLAZOPPA, J. G. and

575:633:577.17

BENTANCUR, M. O.

633.31:581.165.72:577.17

Empleo de fitohormonas en la multiplicación vegetativa por estacas—su aplicación en genética vegetal. (Use of plant hormones in vegetative propagation by cuttings and its application in plant genetics).

Arch. Fitotécn. Uruguay 1940-41 : 3 : 262-75.

Experiments were made on the rooting of lucerne cuttings for the purpose of multiplying specially promising plants clonally. The best results were obtained by treatment with indole-acetic acid and naphthalene-acetic acid. In the normal growing season controls soaked for 24 hours in water before planting rooted almost as well as the treated plants but in winter the treated plants were the only ones that rooted.

1138. BOERGER, A.

575:633:581.192

Aplicación creciente de la química orgánica en la genética vegetal. (The increasing application of organic chemistry in plant genetics).

Arch. Fitotécn. Uruguay 1940-41 : 3 : 319-29.

The use of simple methods of chemical analysis permitting the examination of several hundreds or even thousands of plants per day is the first essential in genetical work. At La Estanzuela in Uruguay several thousand plants of Sudan grass are analysed daily for hydrocyanic acid content, and several hundred plants for oil content or for protein content. By means of such methods it has been possible to raise the oil content of linseed from 32 to 40%.

Other examples of the importance of chemistry in plant genetics are the use of hormones, colchicine, etc., and the production of medicinal and other alkaloids, insecticides, etc., by breeding.

GENETICS 575.1

1139. LYSSENKO, T. D. 575.1:575.3

In response to an article by A. N. Kolmogoroff.

C. R. (Doklady) Acad. Sci. U.R.S.S. 1940 : 28 : 832-33.

KOLMAN, E.

Is it possible to prove or disprove Mendelism by mathematical and statistical methods?

Ibid. 1940 : 28 : 834-38.

Both authors disagree with Kolmogoroff's conclusions (see "Plant Breeding Abstracts", Vol. XII, Abst. 389), maintaining that biological principles cannot be decided by purely mathematical considerations.

1140. HUDSON, J. W. 575.1:578.08(77.3)

A device for visualizing the solution of genetics problems.

Trans. Ill. Acad. Sci. 1941 : 34 : 93-94.

An apparatus for demonstrating Mendelian inheritance by means of an adjustable combination of electric circuits is described. It is suggested that it would be useful for teaching purposes.

1141. WHITE, O. E. 575.113

Genes, species, variability and plant-breeding.

Amer. Nat. 1942 : 76 : 191-207.

The author's theme is the different degrees of variability shown by different species, genera and families and their importance to the plant-breeder. Variability is rare in some of these groups; it is common in others; while some characters show great variability, others show little or none; some genes mutate easily, others appear never to change. These are some of the factors at the disposal of the plant breeder in his efforts to provide the most suitable variety for local conditions.

R. M. I.

1142. JAKOVLEV, P. N. 575.127:634(47)

(I. V. Michurin).

Sovetskaja Botanika (Soviet Botany) 1941 : No. 1-2 : 5-13.

The merits of Michurin and his work are once more retailed: the careful study of the characteristics of a variety before using it as a parent, the use of young hybrid seedlings in raising fruit trees for new areas, the necessity for the best possible care of the parental plants before crossing, the influence of the environmental conditions on the development of the hybrids in the early stages and the use of vegetative hybridization form the main theme of the article.

1143. OWNBEY, M. and 575.127.2:576.12:582

WEBER, W. A.

Natural hybridization in the genus *Balsamorhiza*.

Amer. J. Bot. 1943 : 30 : 179-87.

In the author's view "hybridization between widely separated entities may not indicate the desirability of a complete revision of time-tested taxonomic concepts so much as a need for a better understanding of the nature and development of genetic barriers, and the axiomatic application of hybrid sterility or inviability to the problem of species delimitation may be as unsatisfactory as the axiomatic application of the criterion of morphological difference. Evolutionary divergence between populations appears to be a measure of the effectiveness of the barrier between them, not of its nature. Thus distinctions between geographic barriers of long standing and genetic barriers may be without great significance from the standpoint of evolution and systematics".

Evidence supporting the theory of evolution through genic contamination is also presented.

1144. WRIGHT, S. 575.22

Isolation by distance.

Genetics 1943 : 28 : 114-37.

The theory that considerable genetic differentiation can arise in a continuous population through the effect of distance is developed mathematically.

1145. ANDERSON, E. 575.22:578.08
The technique and use of mass collections in plant taxonomy.
Ann. Mo. Bot. Gdn 1941 : 28 : 287-92.

ERIKSON, R. O.
Mass collections: *Camassia scilloides*.
Ibid. 1941 : 28 : 293-98.

FASSETT, N. C.
Mass collections: *Rubus odoratus* and *R. parviflorus*.
Ibid. 1941 : 28 : 299-374.

These three papers describe the technique of mass collection and illustrate how such collections are of value in the analysis of biological variation and in the elucidation of connected problems.

1146. DELLAZOPPA, J. G. 575.22:633-1.962.4
La uniformidad de las variedades seleccionadas. (The uniformity of selected varieties).
Arch. Fitotécn. Uruguay 1940-41 : 3 : 336-43.

Frequent cases of cross-pollination have been observed in Uruguay in certain varieties of wheat, flax, and soya bean, while other varieties are referred to which have remained pure for 25 years or more. Again, some varieties are definitely more prone to mutation than others: the white eared wheat variety Centenario frequently produces red eared mutants resembling one of its parents, Artigas; Ardito, and also its hybrids, frequently produce abnormally tall variants. The advantages of a certain amount of heterogeneity are discussed, and illustrated by reference to experiments with the wheat variety Litoral; the original variety, which is somewhat variable as regards certain characters such as plant height and date of earing, when compared with a number of selections from it which were more uniform in these respects, always outyielded them, in unduly late and unduly early sowings as well as in experiments sown at the normal time. The variety has been found suitable for cultivation in a wide range of different conditions in the country. The fact that its ear emergence extends over 10-15 days helps to insure it against possible damage by frost or excessive heat and since it is not prone to shedding, the early cases are not damaged if allowed to stand till the later ones are ripe. A local farmer is cited as having sown a mixture of 6 different varieties with success.

1147. RICK, C. M. 575.243:537.531
The X-ray induced mutation rate in pollen in relation to dosage and the nuclear cycle.
Genetics 1943 : 28 : 237-52.

Mutational response of *Tradescantia* pollen is described and its phenotypic effects distinguished from those produced by chromosomal aberration.

1148. ŠLYKOV, G. 575.3(47)
(Soviet Darwinism at the Federal Agricultural Show).
Sovetskaja Agronomija (Soviet Agronomy) 1940 : No. 8-9 : 90-95.

The author pays tribute to Darwin and to such well known exponents of Darwinism and neo-Darwinism in the Soviet Union, past and present, as I. V. Michurin, Timirjazev, T. D. Lysenko and W. R. Williams.

Michurin's achievements in pomology and viticulture, vernalization, phasic development of plants, choice of parents in hybridization and problems of acclimatization, are briefly discussed.

H. F.

CYTOTOLOGY 576.3

1149. CONN, H. J. 576.3:578.08
Progress in the standardization of stains.
Stain Tech. 1942 : 17 : 145-46.

Synthetic orcein, certified by the American Stain Commission, has been prepared by Mac-Andrews and Forbes of Camden, New Jersey.

1150. DEMPSTER, W. T. 576.3:578.08

Paraffin compression due to the rotary microtome.

Stain Tech. 1943 : 18 : 13-24.

The author shows that a considerable degree of distortion, most serious for thin sections, results from the use of the microtome. Conditions most favourable for reducing this effect are discussed and methods for estimating the magnitude and direction of distortion are described.

1151. SEMMENS, C. S. 576.3:578.08

Improved cytological methods with crystal violet.

Stain Tech. 1942 : 17 : 147-48.

A modification of the crystal violet technique for staining chromosomes is described.

1152. TOGBY, H. A. 576.3:578.08

Cytological methods for *Crepis* species.

Stain Tech. 1942 : 17 : 171-75.

Suitable techniques for treating root-tips and pollen grains of this genus are described. In the case of the former, the centromere is left unstained and the heterochromatic segments can be located.

1153. LEVAN, A. and 576.3:581.04

ÖSTERGREN, G.

The mechanism of c-mitotic action: observations on the naphthalene series.

Hereditas, Lund 1943 : 29 : 381-443.

The nature of the action of colchicine and other substances that modify the normal course of mitosis (c-mitosis) and stimulate tumour formation (c-tumours) is discussed.

The authors distinguish between the three effects induced by these substances, viz: c-mitosis, c-tumour formation and poisoning. These effects, although closely connected, are to some extent independent. X-ray irradiation of *Allium* species produces c-tumours but does not affect mitosis, while acenaphthene tends to induce c-mitosis when applied in solution and c-tumours and a reduced number of c-mitoses when allowed to sublimate in moist air.

Experiments show that the efficiency with which α -naphthalene derivatives induce c-mitosis decreases with the addition of hydrophilic radicles. β -naphthalene derivatives will also induce c-mitosis but only over a comparatively narrow concentration range. The effect of colchicine seems to be concerned primarily with spindle formation; only a slight direct action on the chromosomes could be demonstrated. It is suggested in the light of the observations on the effect of hydrophilic radicles, that it is the physical properties and not the chemical differences that determine the relative efficiencies of members of the naphthalene series. Efficiency decreases with solubility in water and is proportional to solubility in organic solvents and the possibility then presents itself that the substances inducing c-mitosis act in the lipid phase. Verne and Verne-Soubiran have demonstrated that colchicine has an effect on lipid metabolism and the authors proceed to discuss various theories of the mechanism of this action.

A number of interesting points of affinity are found between the four processes of c-mitosis induction, c-tumour formation, narcosis and the action of carcinogenic substances. In all these cases, one or more of the vital activities of the cell are considerably modified while the others are left unaffected. A possible explanation of these similarities is that all four processes are concerned with lipid systems. C-mitosis can then be regarded as a narcosis of the factors regulating cell-division and it is suggested that the lipoids concerned may be located in the mitochondria. There is a certain amount of evidence that mitochondria are self-reproducing units carrying cytoplasmic genes and it is possible that they are the bodies concerned in the inheritance of dauermodifications which occur both spontaneously and after artificial induction. Hofmann produced a dauermodification in *Phaseolus* which persisted for six generations by treatment with chloral hydrate, one of the substances inducing c-mitosis. The hypothesis that cancer is a modified type of dauermodification is discussed.

C-tumours may be regarded as due to narcosis of the factors regulating cell-growth. It is suggested that the lipid system concerned is located in the peripheral cytoplasm and the analogous case of the tumours induced by ethylene is cited. Borgström supposes in the latter case that the tumours arise by an increase in the cytoplasmic permeability of the phloem which leads to a scattering of growth hormones and stimulation of isotropic growth. The different

responses made by various species of plant to substances inducing c-mitosis can be easily explained on the theory of differences in the lipid systems concerned. Carcinogenic substances also tend to become less active when hydrophilic radicles are substituted. Graffi has demonstrated that these substances are concentrated in the mitochondria, thus establishing another piece of evidence for the general hypothesis advanced.

1154. CLAUDE, A. 576.31

The constitution of protoplasm.

Science 1943 : 97 : 451-56.

By a combination of centrifuging and staining techniques, it has been found possible to resolve the ground substance of the cytoplasm into two fractions: a "small particle" phase staining purple by the Altmann-Bensley technique and a residual non-staining phase. It is suggested that Hanstein's term "microsome" should be restricted to the "small particles"; these range from 50-200 $\text{m}\mu$ in diameter and consist of nucleo-protein of the ribose type associated with a definite proportion of lipoids. Thymonucleic acid appears to be restricted to nuclei but ribose nucleic acids have been detected in the nucleolus, the secretory granules of the liver, microsomes, plastids, mitochondria and viruses. Since the chromosomes and the latter three bodies are known as self-reproducing units, it is suggested that reproduction may be especially associated with nucleic acids. Further, the microsomes might also be expected to reproduce themselves and thus form the basis of cytoplasmic growth and differentiation. This hypothesis does not, of course, exclude the regulatory activity of the nucleus over the cytoplasm.

1155. FANO, V. and 576.312.32:537.531
MARINELLI, L. D.

Note on the time-intensity factor in radiobiology.

Proc. Nat. Acad. Sci. Wash. 1943 : 29 : 59-66.

A technique of X-ray treatment involving two irradiations separated by a variable time interval is suggested for the investigation of "recovery" processes. The authors also discuss the general mathematical theory covering such processes.

1156. RESENDE, F. 576.312.34.1
576.312.35:578.08

Cariocinese e cromonemata. (Nota preliminar). (Karyokinesis and chromonemata. Preliminary note).

Bol. Soc. Brot. 1941 : 15 : 2nd Ser. 21-27.

In numerous cases the occurrence of both one and two spirals at different phases of mitosis has been observed and chromonema division is regarded as being quite independent of karyokinesis. High temperatures of 30-45° C. have the same effect as low temperatures in causing the chromosomes to contract and have been used in *Vicia* and *Aloe* to facilitate chromosome counting and examination.

1157. SWANSON, C. P. 576.312.341
Differences in meiotic coiling between *Trillium* and *Tradescantia*.

Pap. Mich. Acad. Sci. 1942 : 28 : 133-42.

The meiotic behaviour of *Tradescantia* has been investigated by the author, using the heat shock technique. At early diplotene, the chromatids develop minute coils but they behave as separate units and are not, at least between the centromere and the nearest chiasma, relationally coiled around each other as Darlington has reported. The directions of coiling of sister chromatids may differ.

Despiralization occurs mainly in the prophase but continues through the anaphase and, after being held up through telophase and interphase, is resumed in the following prophase. "Coiling must be viewed, therefore, as a constantly recurring cycle, overlapping somewhat in prophase, interrupted for variable intervals by interphase, and finally to be arrested permanently in non-dividing cells". It is probable that the minor coiling also undergoes a progressive despiralization during prophase.

The differences in behaviour between *Tradescantia* and *Trillium* are discussed with special reference to the properties of the matrix; the possible significance of the inverse relation between matrix and nucleolus is noted.

1158. ÖSTERGREN, G. 576.312.381

Elastic chromosome repulsions.

Hereditas, Lund 1943 : 29 : 444-50.

It is suggested that the mutual elastic pressure between chromosomes and chromatids at their points of contact may go some way in explaining the shape of bivalents at metaphase, the process of terminalization and the configuration of chromatid pairs in colchicine-treated plants.

1159. BEATTY, A. V. 576.353:581.162.3

The division of the generative nucleus in *Eschscholtzia*.

Amer. J. Bot. 1943 : 30 : 378-82.

Typical spindle formation and metaphase plates were observed in the division of the generative nucleus in the pollen of *E. californica*.

1160. RESENDE, F. 576.356:537.531

Movimento, aglutinação, pontes e distensão dos cromosomas na mitose.
(Movement, agglutination, bridges and distension of chromosomes at mitosis).

Bol. Soc. Brot. 1941 : 15 : 2nd. Ser. 163-96.

Observations were made on root tip meristems of *Aloe mitriformis*, *Aloe striata* x *A. saponaria*, two species of *Haworthia* and one of *Encephalartos*; in the hybrid some of the material had been treated with X-rays. Agglutination resembling the effects of the sticky gene in maize was observed at metaphase and anaphase in both treated and untreated material, also anaphase bridges and various other associated irregularities; the irregularities were all much more frequent and pronounced after irradiation.

A fusion was observed between two satellites, resulting in a deletion in one daughter nucleus and a duplication in the other. The various implications of the results are discussed.

1161. BRUMFIELD, R. T. 576.356:575.255:578.08:635.651

Cell-lineage studies in root meristems by means of chromosome rearrangements induced by X-rays.

Amer. J. Bot. 1943 : 30 : 101-10.

A technique described here for identifying a single cell by the chromosome rearrangements induced by X-rays and determining the kind and extent of tissues it produces was applied to the study of primary root meristems in germinating seed of *Crepis capillaris* and *Vicia Faba*. A study of chromosome morphology showed many of the roots to be chromosomal chimaeras of the sectorial type.

1162. HÄKANSSON, A. 576.356.4:576.356

Meiosis in a nullisomic and in an asyndetic *Godetia Whitneyi*.

Hereditas, Lund 1943 : 29 : 179-90.

A monosomic line of the variety Santa Rosa ($2n-1 = 13$) was crossed with Bremen and in the F_2 more than 25% of the progeny were found to be nullisomic ($2n-2 = 12$). There were morphological differences approaching specific rank between these plants and the parents. Meiosis is completely asyndetic with twelve scattered univalents at metaphase; although a restitution nucleus may be formed, the plants are quite sterile. There seems to be no other known case of viable nullisomics in basically diploid species.

1163. FERNANDES, A. and 576.356.5

NEVES, J. B.

Sur l'origine des formes de *Narcissus bulbocodium* L. à 26 chromosomes.
(On the origin of forms of *Narcissus bulbocodium* L. with 26 chromosomes).

Bol. Soc. Brot. 1941 : 15 : 2nd Ser. 43-132.

The author has made a detailed study of mitosis and meiosis in a large number of plants of *N. bulbocodium* from many different localities of Portugal. These included plants with 14, i.e. the diploid number of chromosomes, and with 26 and 28. A comparison of the chromosomes of 28 and 26 chromosome plants leads to the conclusion that the latter have arisen from a tetraploid form with two inversions in different chromosomes followed by the formation of chiasmata and of gametes with 13 chromosomes.

It is suggested that temperature changes are responsible for the formation of the 26 chromosome forms.

It is noted that while the diploids will not grow on acid soils, the tetraploids and plants with 26 chromosomes will grow on moderately acid, neutral and even alkaline soils. Therefore, the form *N. bulbocodium* L. var. *obesus* (Salisb.) is regarded as a sub-species within the collective species *N. bulbocodium* L.

R. M. I.

1164. RANDOLPH, L. F. 576.356.5:575:633
II. Symposium on theoretical and practical aspects of polyploidy in crop plants. An evaluation of induced polyploidy as a method of breeding crop plants.
Biol. Symp. 1941 : 4 : 151-67.

The author points out the necessity for caution in the utilization of auto-polyploids for breeding purposes. Many economic plants are already polyploid and further increases in the chromosome numbers of such types frequently produces inferior forms. On the other hand, used with discretion, the technique is most valuable and may improve the following qualities: sturdiness, size of fruit and seed, frost and drought resistance and content of various chemical substances, e.g. vitamin A and nicotine.

Decrease in fertility is a general draw-back in autopolyploid plants but this can, in some cases, be overcome by hybridizing unrelated lines or by careful selection. The cause of sterility is still obscure, but it is not adequately explained by multivalent formation and meiotic irregularities.

Genetic characters exhibit tetrasomic inheritance as a rule which has the advantage of masking the effect of recessive lethals and maintaining heterosis. Breeders will find, however, that it takes much longer to fix new lines.

1165. LEVAN, A. 576.356.5:575.061.6
The pigment content of polyploid plants.
Hereditas, Lund 1943 : 29 : 255-68.

Species having both diploid and polyploid representatives were selected from eleven different genera and analysed for chlorophyll content. The diploids usually had a higher chlorophyll content per fresh weight of leaf than the polyploids. One of the causes of the lower pigment content of the polyploids is the greater thickness of the leaves. 1

1166. HUSKINS, C. L. 576.356.5:575.24:576.356.2:576.12
II. Symposium on theoretical and practical aspects of polyploidy in crop plants. Polyploidy and mutations.
Biol. Symp. 1941 : 4 : 133-48.

After admitting the extreme difficulty of making a sharp distinction between mutations and small chromosomal aberrations, the author proceeds to observe that undoubtedly mutations are very rare in polyploids. The B and C fatuoid oats are both characterized by chromosomal aberrations although the A type may possibly represent a true mutation. The chances of a recessive mutation becoming homozygous in a polyploid are only slight and consequently such gene changes "can not be subject to positive or negative selection pressures".

Polyploids differ from diploids in that they provide a nuclear environment favourable to chromosomal aberrations. Even homozygous chromosomal deficiencies may be viable according to recent work. It is suggested that these facts imply that polyploids have a considerable potentiality for the micro-evolution of closely allied types by means of hybridization and chromosomal changes. Any radically new evolutionary line is however regarded as unlikely to arise except from diploid forms.

The difficulties attending the use of the concepts of pure-line and allelomorphism in connexion with polyploids are elaborated.

1167. BLAKESLEE, A. F. 576.356.5:581.04
III. Symposium on experimental control of development and differentiation. Effect of induced polyploidy in plants.
Biol. Symp. 1941 : 4 : 183-201.

An account of the various ways in which chromosome doubling affects the development of the plant is presented. Examples are given of cases in which hybrid sterility has been reduced but

it is pointed out that the colchicine technique produces aneuploid and chimaeral plants in addition to the required tetraploids. Also, chromosome doubling need not induce hermaphroditism in dioecious species although this may occur in a few cases.

1168. LÖVE, A. and

LÖVE, D.

576.356.5:581.9

The significance of differences in the distribution of diploids and polyploids.

Hereditas, Lund 1943 : 29 : 145-61.

The authors confirm by statistical analysis the conclusion that the percentages of polyploids in the flora increase with latitude. They also find that the proportion of polyploids among monocotyledons is significantly higher than the proportion among dicotyledons.

HORMONES 577.17

1169. THIMANN, K. V.

577.17:575.17

III. Symposium on experimental control of development and differentiation. The hormone control of plant development.

Biol. Symp. 1941 : 4 : 213-19.

A short review of the role of hormones in plant development is presented. Three types may be recognized: those presumed to control flowering, substances of the vitamin B group necessary for root elongation and the auxins. It has been shown that the *nana* variety of maize is determined by a single gene which probably operates by affecting the enzyme systems regulating the auxin content of the plant.

BOTANY 58

1170. KREIER, G. K.

581.143.26.03:582

(The theory of phasic development in plant systematics).

Sovetskaja Botanika (Soviet Botany) 1941 : No. 1-2 : 39-50.

Many forms within the Linnaean species, some of which have later been accorded specific rank, are shown to be geographical races, which differ only in the character of their vegetative cycle, having evolved in different sets of environmental conditions.

1171.

ŠČEGLOVA, O. A.

581.162.035.1:633.15

(Influence of environment on the development of some monoecious plants I. Influence of the light factor).

Sovetskaja Botanika (Soviet Botany) 1941 : No. 1-2 : 90-94.

Reference is made to the work of Eghis and others in which it is shown that male hemp plants form female inflorescences under the influence of 12 hour days, provided that this is not preceded by a long day period of more than 19 days.

In the present experiments maize plants subjected to an 8 hour day from the start flowered earlier than the controls and produced female flowers in the male inflorescences. When the short day treatment was applied after an initial long day period of 22 days, only an acceleration was observed, there being no change in the sex of the flowers.

In *Luffa*, the control plants grown in long day formed only male flowers. Application of short day from the start caused earlier flowering and the first formed flowers were female. In treatments with a period of long days followed by a period of short days the plants formed male flowers first and female flowers later.

1172. *MUSIUKO, A. C.

581.162.3:633(47)

(The application of supplementary artificial pollination to agricultural crops).

Pan-Soviet Breeding and Genetic Institute of the Workers' Order of the Red Banner.

Pan-Soviet Lenin Acad. Agric. Sci. Moscow 1941 : Pp. 17.

Supplementary artificial pollination—a new method in scientific farming—occupies a most important place amongst the many measures employed to ensure a good yield of maize, sunflower, hemp, lucerne and other crops. The results already achieved are enormous.

* An abridged translation of this paper is on file at the Bureau.

Collective and State farms in the Soviet Union sow a considerable area annually with maize, sunflower, hemp, lucerne and many other cross-pollinated crops. All of these have shown a big increase in yield where this new method has been used.

Tabular data are given to illustrate this and the methods of carrying out the operation are described.

The Odessa Institute of Selection and Genetics has proved that artificial pollination not only increases the yield, but also improves the quality of the seed. Maize seed from areas using artificial pollination produce from three to five centners more than ordinary seed of the same type, grown under similar conditions. It therefore follows that seed should be chosen from crops which have been artificially pollinated.

1173. VANSSELL, G. H. 581.162.32:634.13(79.4)
Factors affecting the usefulness of honeybees in pollination.

Circ. U.S. Dep. Agric. 1942 : No. 650 : Pp. 32.

The efficiency of bee-pollination is discussed with reference to pear trees. Bees are the most efficient pollinating agents as they confine their attention during each flight to a single species. Factors reducing the activity include low temperature, high wind, distance from the nearest hive, and competition from neighbouring plants with nectar of higher sugar concentration.

1174. ADDICOTT, F. T. 581.331.23:577.17(79.4)
Pollen germination and pollen tube growth, as influenced by pure growth substances.

Plant Physiol. 1943 : 18 : 270-79.

It appears that the processes of pollen grain germination and subsequent growth are to some extent independent and stimulated by different substances. Both processes are stimulated by crowding the pollen and the active substances include vitamins, plant hormones, pyrimidines, and purines. None of these substances, however, produces as great an effect as stigma exudate.

INTRODUCTION OF NEW SPECIES 631.524.

1175. VASCONCELLOS, J. DE CARVALHO E 631.524(46.9)
 Acérra da carta fitogeográfica. (**Regarding phytogeographical maps.**)
 Sér. Estud. Inform. Téc., Minist. Econ., Serv. Edit. Repart. Estud., Inform.
 Prop., Lisboa 1942 : No. 20 : Pp. 19.

The various advantages of the provision of phytogeographical maps for the study of the vegetation of any given region are retailed. A study of the existing associations can frequently prevent failure from unsuitable plant introduction, especially in schemes of re-afforestation, reclamation of sand dunes and similar projects. Such studies also reveal the genetical centres of origin of the species concerned. Portugal contains the centres for such genera as *Ulex*, *Thymus*, *Genista* and *Digitalis* and secondary centres for *Quercus*, *Dianthus* and others, and forms a part of the centre of many Mediterranean species such as *Avena strigosa*, *Olea europaea*, globe artichoke, yellow lupin, beet and pear.

A phytogeographical investigation of the Duro basin and the Lisbon peninsula is now in progress.

PLANT DISEASES AND PESTS 632

1176. ANDREWS, W. B. and 632.3:576.16:635.655:581.02
 BRISCOE, C. F. 632.3:576.16:633.35:581.02
The response of vetch and soybeans to strains of nodule bacteria.
 J. Amer. Soc. Agron. 1943 : 35 : 271-78.

The reactions of soya beans and vetch to different strains of nodule bacteria are described. It is suggested that nitrogen-fixing efficiency, and not nodule formation, should be the criterion for demarcating cross-inoculation groups. Both soil and climate influence the reaction between the plant and bacterium.

1177. QUINTANILHA, A. 632.4:575.1
 Doze anos de citologia e genética dos fungos. (**Twelve years of cytology and genetics of the fungi.**)
 Agron. Lusitana 1941 : 3 : 241-306.

The author outlines the knowledge on fungus genetics at the time he started work in 1928 and

the results of his intensive study of the subject since that time, made chiefly with *Coprinus fimetarius*. Two factors for sterility in the species have been established, one absolute and the other relative. A "dwarf" gene produces mycelia resembling those caused by growing in culture media of very high osmotic pressure.

The nature of sex in the Basidiomycetes is discussed and the sexual behaviour of 45 species given. Different species were found always to be inter-sterile, whilst geographical races within a species were inter-fertile, and this is put forward as the most reliable specific criterion in this group of organisms.

1178. GEŠELE, E. E.

632.4:576.16

(The principles of phytopathological assay in selection).

Ogiz, Selhозгиз, Moscow 1941 : Pp. 120.

In this monograph an attempt has been made to throw more light on the susceptibility and resistance of plants to infection caused by the rust and smut fungi, bacteria, and by some of the other parasites of the flowering plants; at the same time, the author gives, in the light of his own experiences, the basic principles by which the grower should be guided in utilizing for the purposes of selection the disease resistance, which is apparently an hereditary character, of economically important plants.

The biological specialization of causal organisms of infection, their apparent preference for attacking one genus, species or variety, reflects their selective affinity or need for a particular kind of food as provided by the hosts. The various gradations of susceptibility, disease resistance and immunity arise from and may be explained by the degree of biological adaptation existing between the infective agent and the host-plant. Although the use of international collections of differential hosts may be of value in the work of selecting this or that variety resistant or immune to a number of biotypes of the parasite, the author deems it expedient to introduce a new concept, isoreagent, denoting a group of races all giving the same reaction with regard to the particular varieties actually cultivated in any given region.

Discussing different degrees of susceptibility and resistance, the author traces the direct causal connexion between the "infectious background" (meaning by this such conditions favouring the onset of disease as monoculture, short rotation, etc.) and the "infective load or charge", that is, a quantitative variation of the infective agent needed to produce a partial or mass outbreak of the disease in natural or artificial infection.

Three chapters of the book are devoted to the technique of testing and to the critical survey of the methods of phytopathological determinations as an aid in selection. As may be seen from the number of references cited, the author draws freely upon the Russian and foreign literature on the subject, concentrating, however, on the practical application in conditions of the Steppe-Forest zone in the Southern U.S.S.R. Hybridization is recognized as the principal means of revealing the correlation, on the genetical plane, between the polymery of the host reaction and the parasitic biotypes on the one hand and the heightening of the disease resistance on the other.

A differential scale of appraisal—presumably useful in Russian conditions—in different stages of selection as related to the "infectious background" is given in the concluding chapter of the monograph.

H. F.

1179. YAMAMOTO, Y.

632.422.3:575.125:581.6

(On some new yeast-types produced by hybridization).

Jap. J. Genet. 1940 : 16 : 302-04.

Yeast hybrids have been obtained between *Saccharomyces Batatae* x *S. Shaoshing* forma I, *S. ellipsoideus* x *S. Shaoshing*, *S. Batatae* x *S. ellipsoideus* and *S. Shaoshing* x *Hosigaki* (a yeast derived from a dried persimmon). Definite indications of heterosis were observed; the hybrids, though not larger than the parents, had denser cell contents and a higher rate of fermentation. Spore formation was most frequent in the hybrid last mentioned.

1180. NICKERSON, W. J. and

THIMANN, K. V.

632.422.3:581.162.4

The chemical control of conjugation in *Zygosaccharomyces*. II.

Amer. J. Bot. 1943 : 30 : 94-101.

A physiological and biochemical study.

1181. TAPKE, V. F. 632.451.2:576.16:633.16
Physiologic races of *Ustilago nigra*.

Phytopathology 1943 : 33 : 324-27.

Seven distinct races of *Ustilago nigra* have been found in collections from twenty-three states. The characters, distribution and frequency of these races are described.

1182. TAPKE, V. F. 632.451.2:582:633.16:578.088(73)
Occurrence, identification, and species validity of the barley loose smuts, *Ustilago nuda*, *U. nigra* and *U. medians*.

Phytopathology 1943 : 33 : 194-209.

In a comparative study from 33 American states it is concluded that loose smut of barley is caused either by *Ustilago nuda* or *U. nigra* or both. These two species of smut are easily distinguished by their mode of spore germination and an intermediate type of germination, sometimes attributed to *U. medians*, is shown to be a mixed type whose components, the two preceding species, may be isolated by suitable techniques. It is concluded that *U. medians* is not a valid species.

1183. JOHNSTON, C. O., 632.452:576.16:633.11
 HUMPHREY, H. B.,
 CALDWELL, R. M. and
 COMPTON, L. E.
Third revision of the international register of physiologic races of leaf rust of wheat [*Puccinia rubigo-vera* *tritici* (*Triticina*)].
 U.S. Dep. Agric., Bur. Pl. Industr., Washington, D.C. 1942 : Pp. 20.
 (Mimeographed).

This third revision contains an analytical key for the identification of the physiological races of the fungus and a table showing the reactions of races 1 to 129 to nine standard wheat varieties. Information is also given on the original description, place and year of discovery or report of these physiological races.

1184. WELLMAN, F. L. 632.484:575.24:635.64:578.08(73)
Increase of pathogenicity in tomato-wilt *Fusarium*.
 Phytopathology 1943 : 33 : 175-93.

Fusarium bulbigenum var. *Lycopersici* usually saltates in culture to a less virulent form but occasionally more virulent saltants are produced. This observation may explain the instances of local wilt damage that have occurred recently to wilt-resistant tomatoes. It is also suggested that in breeding for resistance, highly virulent pure-line cultures should be used instead of the mixed inoculum commonly used. Mixed strains may interact in a complex way in the infected plants. Changes in virulence are regarded as arising from adaptive variation, and not from true mutations.

1185. 632.484:576.16
 SMITH, T. E. and 633.71-2.484:576.16:631.521.6
 SHAW, K. J. 633.492-2.484:576.16:631.521.6
 633.51-2.484:576.16:631.521.6
Pathogenicity studies with *Fusaria* isolated from tobacco, sweet potato and cotton.
 Phytopathology 1943 : 33 : 469-83.

It is shown that the pathogenicity of isolates of *Fusarium* section *Elegans* is not restricted to a single host species. The concept of physiological race is applied to these forms and three such races, probably attributable to *F. oxysporum* Schl., are distinguished. The differential hosts are flue-cured tobacco, Burley tobacco, sweet potato and cotton. Race 1 infects Burley tobacco and sweet potato. Race 2 infects both these plants and also flue-cured tobacco. Race 3 infects Burley tobacco and cotton. Only one sample of *Fusarium* out of 94 failed to fit in to this scheme, viz. an isolate infecting cotton but not Burley tobacco; this form may have lost its virulence owing to conditions under culture.

1186. HARRINGTON, C. D. 632.7:576.16:635.656
The occurrence of physiological races of the pea aphid.
 J. Econ. Ent. 1943 : 36 : 118-19.

Evidence is presented to show that there are at least four physiological races of pea aphid (*Illinoia pisi*) in the United States; these differ from each other both in size and virulence.

1187. VALLEAU, W. D. and
JOHNSON, E. M. 632.8:575.1:576.12:633.71(73)
An outbreak of plantago virus in burley tobacco.
Phytopathology 1943 : 33 : 210-19.

A plantago virus, frequent in Kentucky and closely allied to tobacco mosaic virus, has been shown to cause virus diseases in various varieties of tobacco. The symptoms it produces are subject to genetic control by the necrotic spotting genes N' and N , the latter derived from *Nicotiana glutinosa*. The authors suggest that the plantago virus, which shows a limited variability, is the parent type from which the various tobacco-mosaic viruses have evolved.

1188. BLACK, L. M. 632.8:632.7:576.16:633.491(79.4)
Genetic variation in the clover leafhopper's ability to transmit potato yellow-dwarf virus.
Genetics 1943 : 28 : 200-09.

Two races of clover leaf-hopper (*Aceratagallia sanguinolenta*) have been obtained by selective breeding. These differ in their efficiency as vectors of potato yellow-dwarf virus. The genetics of crosses between the races and the effect of sex are described.

1189. SPENCER, E. L. and
PRICE, W. C. 632.8:633.71:578.08
Accuracy of the local-lesion method for measuring virus activity.
I. Tobacco-mosaic virus.
Amer. J. Bot. 1943 : 30 : 280-90.

A technique for measuring the activity of tobacco mosaic virus by a local lesion method is described.

1190. ŠALYT, M. S. 632.951.1-1.524:581.6(47)
(Wild insecticidal pyrethrums in the U.S.S.R.).
Sovetskaja Botanika (Soviet Botany) 1941 : No. 3 : 97-100.

The pyrethrin content of the inflorescences of *Pyrethrum roseum* (Adams) M.B. and *P. carneum* M.B. was found to be from 0.22 to 1.22%, which is as high as that of *P. cinerarifolium*; since the first two species will grow in more northerly localities than the third it is recommended that breeding work should be carried out with them. Certain other species are suggested as being worthy of attention.

ECONOMIC PLANTS 633

1191. **Agronomy handbook for South Carolina.** 633(75.7)

Bull. Clemson Agric. Coll. U.S.D.A. 1942 : No. 104 : Pp. 137.
This hand-book includes many references to the varieties of economic plants most suited for use in South Carolina.

1192. CROSS, W. E. 633(82)
633.61:575(82)
Notas sobre el progreso de la agricultura y las industrias agropecuarias de Tucumán durante los últimos sesenta años. (Notes on the progress of agricultural and rural industries in Tucumán during the last 60 years).
Bol. Estac. Exp. Agric. Tucumán 1942 : No. 36 : Pp. 75.

In the section on sugar cane the development of the sugar industry in Argentina from 1876 onwards is traced. The variety question is discussed, including the early efforts to replace the creole canes by imported canes, the most popular of which has been P.O.J. 36. Since the recent appearance of smut however this cane is being rapidly superseded by Co. 281, C.P. 29/320 and various new Tucumán seedlings.

Information is given on the cultivation of a number of other crosses in the Republic.

1193. REGEL, C. 633-1.524(4)
Beiträge zur Kenntnis von mitteleuropäischen Nutzpflanzen. (Contributions to the study of central European economic plants).
Angew. Bot. 1942 : 24 : 465-84.

The development and exploitation of the plant resources of eastern and south eastern Europe is discussed from the German standpoint, particular attention being given to the different tasks

and problems of organization in the various countries concerned. The subject is treated under the following heads *inter alia*: organization of research in agriculture and applied botany in White Ruthenia ("Weissruthenien", as defined by the author) and Lithuania; utilization of existing plants and animals and the introduction of new forms, breeding and experimental work, planning and management, soil cultivation and production of rubber and other raw products from plants (including gutta percha, tanning substances, resins and oils) in Rumania.

1194. RIEHM, E. 633-2-1.521.6
 Über die Zunahme der Pflanzenkrankheiten und Schädlinge. (On the
 increase of plant diseases and pests).
 Z. PflKrankh. 1943 : 53 : 3-12.

In this study based on the relevant literature, the causes of the greater frequency of plant diseases and pests in modern times are considered together with the question whether the pathogenicity of the parasites or the susceptibility of the plants has increased. In spite of the instances known (which are relatively few) of differences in virulence due to the occurrence of physiological races of fungi by mutation, the author rejects the view that the fungi in general display a tendency to increased virulence and he refutes alleged examples of such phenomena as unproved or susceptible of some other explanation. He applies a similar argument to the case of insect pests and he also maintains that the cultivated plants have not become more susceptible and that the breeder's task has been consistently to combine resistance with other desirable features in crop plants. Incidentally an instance is cited showing that an old land variety (wheat) may be highly susceptible to disease. Virus diseases, however, admittedly constitute an exception to the author's thesis, but it is hoped that adequate control measures will be developed and widely applied.

CEREALS 633.1

1195. WHITCOMB, W. O. 633.1-1.521.5(78.6)
 The grain inspection laboratory. Twenty-five years' service to
 Montana.
 Bull. Mont. Agric. Exp. Sta. 1941 : No. 396 : Pp. 19.

The work of the laboratory includes the inspection and grading of agricultural seeds, estimations of their protein contents and milling and baking tests.

1196. AUSEMUS, E. R. 633.1-2.4-1.521.6:016
 Breeding for disease resistance in wheat, oats, barley and flax.
 Bot. Rev. 1943 : 9 : 207-60.

This extensive and useful survey of the literature is based mainly on early and recent publications in the English language on resistance to rusts, smuts, scab, mildew, wilt and foot-rots. The bibliography (269 references), however, includes also some German and Russian references. The achievements in the United States in producing disease resistant varieties of commercial importance are recorded.

1197. MCFADDEN, E. S. 633.1-2.452-1.521.6:575.12(76.4)
 New developments in small grain breeding for grain and forage.
 Pap. Tex. Agric. Work. Assoc. 1942 : 126-28.

An attempt has been made to breed cereals for use as winter forage crops in the region lying south-east of the Edwards Plateau, Texas. Ranger is a new variety of oats, resistant to crown rust and smut and moderately winter-hardy; it is a selection from Victoria x Nortex. Rustler is derived from the same cross and resembles Ranger although maturing later; neither species is resistant to stem rust. A giant hooded forage barley has been developed from Hanna x Horsford; it is a six-row leafy type resistant to some races of leaf rust.

The following grain varieties are also mentioned. Selection 41-16-3-3 from Hope x Mediterranean is a high-yielding wheat combining resistance to stem and leaf rusts with satisfactory baking quality. Selection 41-121 is similar but its baking quality is doubtful; it matures rather later. Uruguay wheat F.P.I. 116326 is resistant to stem and leaf rust and is adapted to growing under irrigation in the lower valley of the Rio Grande; C.I. No. 1383 is a barley imported from North Africa; it is practically immune to leaf rust.

WHEAT 633.11

1198.

633.11(73)

The wheat contest—1941.

Circ. Clemson Agric. Coll. U.S.D.A. 1941 : No. 199 : Pp. 16.

The best yielding varieties of wheat are shown to be Coker's Hardired, Coker's Redhart and Maret's Blue Straw. The value of fertilizers, correct planting date and high seeding rate is evident and also the increased yield obtained when the seed is procured each year from the breeder.

1199.

633.11(82)

Distribución de las variedades de trigo aconsejadas para la siembra del año 1943 por el Tribunal de Fiscalización de Semillas. (**Distribution of the wheat varieties recommended by the Seed Certification Tribunal for sowing in 1943.**)

Noticioso, B. Aires 1943 : 8 : 41-44.

The Argentine Republic is divided into six sub-regions for purposes of wheat growing and certain modifications in the varieties recommended for the different regions are announced. New varieties to be recommended are Benvenuto Inca, Buck Clarameco, Klein Alberti and Klein 157.

1200. CLARK, J. A.

633.11:575(73)

Registration of improved wheat varieties, XV.

J. Amer. Soc. Agron. 1943 : 35 : 245-48.

Pawnee (Reg. No. 330), a selection from a Kawvale x Tenmarq cross made at Kansas in 1931, is a winter wheat with white glumes and hard red kernels. It is earlier than its parents, moderately resistant to bunt, resistant to Hessian fly and loose smut and had some resistance to stem rust. In baking quality it nearly equals Turkey and is slightly less winter hardy than Turkey or Kharkof. Its average yield was higher than that of Cheyenne, Nebred or Turkey. Comanche (Reg. No. 331) is from a cross between Oro and a Tenmarq selection. It is a hard red winter wheat with high yield, good test weight, earliness, stiff straw, high resistance to many of the important races of bunt, resistance to leaf rust, and less susceptibility to stem rust than other varieties. It equals Turkey in baking quality but is susceptible to loose smut and Hessian fly and is only moderately winter hardy.

R. M. I.

1201. WALDRON, L. R.

633.11:575(78.4)

A new wheat variety for western N.D.

Bi-m. Bull. N. Dak. Agric. Exp. Sta. 1942 : 4 : No. 4 : p. 10.

The North Dakota Agricultural Experiment Station has released a new wheat variety, named Vesta (cf. "Plant Breeding Abstracts", Vol. X, Abst. 115) for 1942. Vesta is a white bearded wheat with the same parentage as Rival. It is very resistant to stem rust but less resistant to leaf rust than Rival. It gives a high yield and its milling and baking qualities compare favourably with those of Thatcher.

1202. WALSTER, H. L.

633.11:575(78.4)

North Dakota wheat breeders in action.

Bi-m. Bull. N. Dak. Agric. Exp. Sta. 1942 : 4 : No. 3 : 1-6.

In this review of the work on wheat breeding which has been carried out by the North Dakota Agricultural Experiment Station, the selection No. 2822 is given as an example of the extensive investigations which have been carried out on a few promising selections. This plant was selected from Mercury x a hybrid selection N.N. 1383, back-crossed to Mercury, and tested for a number of years. The tests revealed certain weaknesses which involved further selections. However certain selections have been used for crosses with other wheats and provided valuable material.

A group of selections from Mercury x R.L. 625 have been studied. These included the one named Premier, which although possessing many favourable qualities has not been released because of the unfavourable results of milling and baking quality tests.

1203. BOERGER, A.

633.11:575(81)

Las perspectivas del cultivo triguero en el Brasil. (**Wheat growing prospects in Brazil.**)

Arch. Fitotécn. Uruguay 1940-41 : 3 : 239-61.

The importance of making full use of the local races is illustrated by reference to the large number of improved varieties that have been produced in the River Plate region from crosses

with the local wheat Pelón 33 c (syn. Favorito) or its descendants; this variety has entered into the parentage of most of the best new wheats produced both in Argentina and Uruguay, and many of these varieties have been shown to be adapted also to cultivation in the Brazilian state of Río Grande do Sul; this applies particularly to the Uruguayan varieties Centenario and Porvenir. For the more interior zones of Brazil special breeding work will be required and this has already been started with success at the "Alfredo Chaves" station, where the varieties Riosulino, Trintacinclo and Farrapo have been produced. The use of the local varieties is particularly urged for the production of forms possessing sufficient earliness and other characters that go to make wheat cultivation possible in the more equatorial latitudes. The variety Floreana, produced in Brazil by crossing Florence x Mentana, is one of the earliest wheats in existence; other early varieties have been obtained from the same combination and from the Brazilian variety Polyssú and confidence is expressed that suitable breeding work will succeed in making wheat cultivation in Brazil profitable once more.

1204. CALDWELL, R. M. and

COMPTON, L. E.

633.11:575.113.7

Complementary lethal genes in wheat.

J. Hered. 1943 : 34 : 67-70.

A pair of complementary genes: *Le* and *Le* 2, are reported as causing in combination a progressive lethal necrosis. The plants bearing the genes remain normal until the two-leaf stage after which the leaves begin to wither at the tips, the necrosis subsequently spreading downwards and killing the plant. Gene *Le* is found in Marquillo, Big Club and P.I. 94587 and *Le* 2 is found in Wabash, Trumbull, Minhardi and Dawson; the double recessive condition occurs in F.H. 27 and H.H. 55. Hybrids obtained from crossing *Le Le le 2 le 2 x le le Le 2 Le 2* are non-viable but plants containing one or none of the dominant genes are viable. The conclusions stated above were tested by crossing plants presumed to have one lethal gene with the double recessives and then crossing the hybrid to the varieties presumed to possess the other gene, i.e. (*Le Le le 2 le 2 x le le 2 le 2*) x *le le Le 2 Le 2* and (*le le Le 2 Le 2 x le le le 2 le 2*) x *Le Le le 2 le 2*. The progeny of these crosses segregated into 315 normal and 321 necrotic plants in close agreement with the expected 1:1 ratio. The surviving progeny of these two tests were intercrossed, i.e. *le le Le 2 le 2 x Le le le 2 le 2* and the progeny segregated into the expected ratio of three normal to one necrotic.

The cross (Wabash x Trumbull) x Marquillo gave necrotic progeny only and the cross (Marquillo x Big Club) x Wabash gave only one viable offspring and it is assumed therefore that the lethal genes of the various groups are allelic *inter se*.

1205.

633.11:575.127.5:575.129:576.354.4:581.162.5

SEARS, E. R. 633.11 *Aegilops*:575.127:575.129:576.354.4:581.162.5 Chromosome pairing and fertility in hybrids and amphidiploids in the *Triticinae*.

Res. Bull. Mo. Agric. Exp. Sta. 1941 : No. 337 : Pp. 20.

Twenty-four different hybrids between seven-chromosome species of *Triticum*, *Aegilops* and *Haynaldia* had an average frequency of univalents per microsporocyte ranging from 0.32 to 12.66. Amphidiploids obtained from 18 of these hybrids varied in fertility from nearly perfect to almost zero. There was no constant relationship between 4*n* fertility and lack of 2*n* pairing. Several reasons are suggested for this. Some 2*n* hybrids failed to show all the pairing of which they were capable, thus leading to a discrepancy between 2*n* pairing and 4*n* multivalent formation. In some amphidiploids, notably in *Aegilops umbellulata* x *Haynaldia villosa* fertility was reduced by an excessive number of univalents. In some amphidiploids fertility was relatively high in spite of a high number of multivalents; in others, fertility was adversely affected by environmental conditions.

A total of 111 among 144 offspring of amphidiploid plants from all crosses were of regular chromosome constitution.

S. E.

1206.

633.11:575.127.5:575.129:581.04

SEARS, E. R.

633.11 *Aegilops*:575.127:575.129:581.04

Amphidiploids in the seven-chromosome *Triticinae*.

Res. Bull. Mo. Agric. Exp. Sta. 1941 : No. 336 : Pp. 46.

Application of 2% colchicine in lanolin on coleoptiles of germinating seeds and repeated

application of a 0.5% aqueous solution of colchicine to the crowns of potted plants placed in a damp chamber were both found to give a high proportion of polyploid sectors without undue killing. The latter method is to be preferred for hybrids since plants may be propagated vegetatively before treatment and losses so minimized.

From 19 hybrids involving seven-chromosome species of *Triticum*, *Aegilops* and *Haynaldia*, amphidiploids were obtained. These are described in full and the parents, diploid hybrids and amphidiploids compared. Tetraploid sectors were indistinguishable from diploid portions of colchicine-treated hybrids, except for their fertility and, in some cases only, their larger stomata.

Plants grown from $4n$ seed had spikes not appreciably different from $2n$ and $4n$ spikes on F_1 plants.

The possibility of predicting amphidiploid characteristics from a study of the parental characters is considered. In the cases studied the amphidiploids were intermediate between the parents in most characters. Dominance, where present, was rarely complete, an exception being unsplit palea as opposed to the split palea found in *Triticum monococcum* and *T. aegilopoides*. Little evidence was found of hybrid vigour; only in length of rachis segments and size of seeds was there a tendency for the amphidiploids to exceed the parental average. Increased seed size is regarded as being largely an effect of chromosome doubling rather than of hybrid vigour. Some of the amphidiploids were earlier in ripening than the parental mean and since they attained the size of the parent species this may be regarded as some evidence of hybrid vigour.

It is considered unlikely that it will become possible to predict the extent of hybrid vigour to be found in an amphidiploid with much accuracy or whether in any particular combination there will be such disharmony that a reduction in size will be brought about. S. E.

1207. CÂMARA, A.

633.11:576.356.2:537.531

O problema da fragmentação cromosómica, operada pelos raios X, estudado no *Triticum monococcum*. (The problem of chromosome fragmentation caused by X-rays, studied in *T. monococcum*).

Agron. Lusitana 1941 : 3 : 341-59.

Observations were made on the two SAT chromosomes in root tips from plants produced by irradiated grains. Fragments of various kinds were observed and also definite cases of translocation from one of the other chromosomes to one of the SAT chromosomes; there were also more complicated rearrangements.

Two points on the chromosome showed the maximum number of breaks—the distal zone and the zone adjacent to the centromere, and it is pointed out that these 2 critical zones are the heterochromatic regions according to Kostoff (cf. "Plant Breeding Abstracts", Vol. IX, Abst. 17).

Breaks in the vicinity of the centromere seem to fuse more easily than those at the distal end.

1208. SVINAREV, V. I.

633.11:581.143.26.035.1:575.11

(An investigation of the length of the vegetative period in wheat. On the dominance in F_1).

Bull. Acad. Sci. U.R.S.S., Sér. Biol. 1942 : No. 3 : 173-77.

Observations were made in 1938 on 92 different hybrid combinations comprising crosses of *Triticum durum* x *T. durum*, *T. durum* x *T. vulgare* and *T. vulgare* x *T. vulgare*. The hybrids were of five different types, namely: (1) F_1 comes into ear before the earlier of the two parents; (2) F_1 ears at the same time as the early parent; (3) F_1 ears later than the early parent; (4) F_1 ears at the same time as the later parent, and (5) F_1 ears after the later parent; the majority of the hybrids fell into the intermediate group. The hybrids came into ear anything between 1 and 20 days after the earlier parent.

In 1939 the hybrids were grown in pots and subjected to different lengths of day, the parents being used as controls. Treatment (1) received normal day, treatment (2) continuous light, and (3) a short, 9 hour day. Reduction in day length caused an extension of the vegetative period in both parents and hybrids and lengthening the day had the converse effect. The relationships between parents and hybrids were also changed by altering the length of day; thus hybrid Erythrospermum 0841 x Melanopus 062 in normal day eared simultaneously with the early parent, in continuous light one day later than the early parent and in short day later

than either parent. Again, hybrid Melanopus 062 x Hordeiforme 0226 in normal day eared one day earlier than the early parent and in short day 16 days later.

1209. SVINAREV, V. I. 633.11:581.143.26.035.1:575.11
 (The segregation of F_2 and F_3 wheat hybrids with respect to the length of the vegetative period).

Bull. Acad. Sci. U.R.S.S.; Sér. Biol. 1942 : No. 3 : 178-80.

The F_2 plants of three *Triticum vulgare* x *T. vulgare* crosses and one *T. vulgare* x *T. durum* cross were sown in the field side by side with the respective F_1 and the original parents. There was no correlation between the date of earring of the F_1 and the F_2 generations; some F_2 plants came into ear earlier than the corresponding F_1 but later than the earlier parent, and others even earlier than both the F_1 and the earlier parent.

T. durum var. *australe* Perc. was crossed with two Russian forms of *T. durum* 1-3 days later in earring. Most of the F_2 hybrids eared at the same time as the parents but some were much later and a few failed to produce ears at all. The majority of the F_3 plants eared earlier than the parents or at the same time but again some plants were exceedingly late and a few behaved as winter forms and failed to come into ear at all.

It is concluded that selection for time of maturity cannot be undertaken in the F_1 as recommended by Lysenko and Prezent.

1210. CHANG, S. C. 633.11:581.148:581.4
 Morphological causes for varietal differences in shattering of wheat.

J. Amer. Soc. Agron. 1943 : 35 : 435-41.

The various anatomical characters that may be correlated with shattering of wheat are discussed. Susceptibility to shattering is often a varietal character and it is found that a multiple correlation coefficient of 0.62 occurs between five anatomical spikelet characters and shattering percentage.

1211. HETHERINGTON, E. V. and 633.11:581.6
 SMITH, G. S.
 Constancy of rank of durum wheats in macaroni color.

Cereal Chem. 1943 : 20 : 345-51.

An investigation of the quality of *Triticum durum* varieties with reference to macaroni colour is reported. The new varieties resistant to stem rust were also superior in quality.

1212. SCHARNAGEL, TH. 633.11-2.111-1.521.6:575(43)
 Fortschritte der Weizenzüchtung unter Beachtung der Auswinterung.
 (Advances in wheat breeding with regard to winter injury).
 Mitt. Landw. 1943 : 58 : 23-24.

Certain selections of local land wheats such as Samland, Sandomir and Eppweizen have proved much more capable of withstanding the severe winters of East Prussia than have any of the varieties from central Germany. The variety Hauer II, from a cross between a French wheat and one of the East Prussian land wheats, has also proved very hardy.

The author's experience at Weihenstephan has shown that when sown not too early in the spring, the hardiest varieties retain a procumbent habit through the summer, whereas less hardy varieties tend to assume a more erect habit and some even show signs of coming into ear.

The necessity of producing wheat varieties adapted to the different climatic zones is strongly urged, as is also the use of the land races in the new territories that Germany has recently acquired or hopes to acquire.

1213. GRANHALL, I. 633.11-2.111-1.521.6:575.127.2
 Genetical and physiological studies in interspecific wheat crosses.
 Hereditas, Lund 1943 : 29 : 269-380.

The author presents a large body of data on the inheritance of various physiological and morphological characters in wheat crosses. Most of the crosses were made between varieties of *T. vulgare* (6x) and *T. turgidum* (4x) but a number of other crosses were also made. Pentaploids derived from the above crosses were usually intermediate between the two parents although hybrid vigour was usual.

The segregation of types in the F_2 showed a complete range of chromosome numbers between 28 (4x) and 42 (6x). It was found however that the numbers of individuals bearing each chromosome number were not normally distributed but tended to lie on a bimodal curve. It is suggested that this is caused by elimination of univalents in the gametes and suppression of certain highly sterile combinations. Stable tetraploid lines were recorded from the F_4 but no stable hexaploid lines were found until the F_5 . One case of a fairly stable line in which $2n = 44$ was derived from the F_3 of Minhardi x Rivet Cambr. 4.

A 3 : 1 Mendelian inheritance was found for the characters: beared and pubescent heads. The genetics of the morphological characters depending on genes of the K complex was investigated and the following genetic constitutions established: *T. vulgare* and *T. compactum*, $KKkkK^dK^d$; *T. speltoides* (from *T. vulgare* x *T. turgidum*) and speltoid mutation A of *T. vulgare*, $KKKKK^dK^d$; *T. Spelta*, $KK^sK^sK^dK^d$; *T. turgidum*, $KKKK$ and *T. contractum* (from *T. vulgare* x *T. turgidum*), $KKkk$.

A positive correlation was found between hexaploidy and winter-hardiness, and osmotic pressure of cell-sap and winter-hardiness; there was however no significant difference in osmotic pressure between tetraploids and hexaploids. Winter-hardiness was also correlated with viscosity of protoplasm. Hexaploids tended to mature earlier than tetraploids and were more resistant to *Bacterium translucens* var. *undulosum*. Tetraploids were more resistant to *Puccinia glumarum* and *P. graminis*.

The systematics of the genus *Triticum* is discussed and it is pointed out that the species differ both in chromosome number and in various Mendelian factors such as the K complex which is regarded as a multiple-allelomorphic series of completely linked genes. Since the species of *Triticum* differ in so few genetic characters, it is concluded that they are hardly worthy of specific rank.

1214. NAZARENKO, S. I. 633.11-2.112-1.521.6:575.3
(Drought resistance of plants as influenced by the conditions under which the seeds were raised).

Sovetskaja Botanika (Soviet Botany) 1941 : No. 1-2 : 72-79.

Seeds were taken from a number of plots of the winter wheat Ukrainka that had received various cultural treatments. The plants arising from the different lots of seeds showed clear differences in their capacity to withstand a ten day drought period, those from seed from the plots receiving the best treatment being the most resistant. The differences were still detectable when the seeds sown were selected so as to be all of the same weight. When the period of drought was prolonged the differences were still more pronounced.

The second generation obtained from the tested plants showed similar differences in drought resistance.

1215. ATKINS, I. M. 633.11-2.451.2-1.521.6
Reaction of some varieties and strains of winter wheat to artificial inoculation of loose smut.

J. Amer. Soc. Agron. 1943 : 35 : 197-204.

Data are given in tabulated form on the resistance of a large number of varieties and strains of winter wheat and many promising unnamed hybrid selections to *Ustilago Tritici* (Pers.) Rostr. Experiments showed that the period of early to mid anthesis is the best for inoculation. None of the commercial hard red winter wheat varieties was resistant. Pawnee, a new variety from the cross Kawvale x Tenmarq was resistant. Other varieties resistant for the period of the experiment were Kawvale, Forward, Purdue No. 4, Leap, Zimmerman, Purplestraw, Early Premium and Minhardi. For use in breeding work in Texas, where in the more humid districts losses by loose smut may assume serious proportions, Kawvale and selections from the cross Hope x Mediterranean are considered most promising.

R. M. I.

1216. RODENHISER, H. A. and TAYLOR, J. W. 633.11-2.451.3:576.16:581.143.26.035.1:631.521.6(73)
The effect of photoperiodism on the development of bunt in two spring wheats.

Phytopathology 1943 : 33 : 240-44.

An account is given of an experiment to determine the effect of continuous light on the resistance of wheat to smut infection. Canus and Ulka wheats were inoculated with various races

of *Tilletia laevis* and *T. Tritici*, and in many cases it was found that long-day treatment decreased the resistance, the effect, however, depending on the race of smut used.

1217. MORRIS, H. E. and
SCHLEHUBER, A. M. 633.11-2.451.3:576.16:631.521.6
Studies on control of bunt of wheat.

Bull. Mont. Agric. Exp. Sta. 1941 : No. 393 : Pp. 18.

Varietal resistance to *Tilletia Tritici* and *T. laevis* is discussed. The physiological races of these fungi occurring in Montana are listed and the special problem that they present to the plant-breeder is considered.

1218. REITZ, L. P.,
JONES, E. T.,
JOHNSTON, C. O. and
PAINTER, R. H. 633.11-2.452-1.521.6(73)
633.11-2.7-1.521.6
Agronomic tests of new resistant varieties and hybrids of hard red winter wheat in the presence of stem rust and Hessian fly.

J. Amer. Soc. Agron. 1943 : 35 : 216-29.

Details are given of the yield and resistance to stem and leaf rust and to Hessian fly of a large number of strains and varieties of winter wheat grown (a) under favourable conditions at Manhattan, Kansas, (b) under conditions of stem rust infection at Ramona, Kansas, and (c) under conditions of Hessian fly attack at Springfield, Mo.

Further resistance to stem rust and Hessian fly is needed in commercial varieties and for this purpose there are several promising strains and selections, especially some Marquillo hybrids.

R. M. I.

1219. HART, H. and
ALLISON, J. L. 633.11-2.452-1.521.6:576.3:581.02
A browning reaction to stem rust in wheat.

Phytopathology 1943 : 33 : 484-96.

The cytology of the "browning reaction" which sometimes appears after infection with stem rust is described. Both the genotype of the plant and the environment condition the reaction. Only some varieties are known to react and the optimum external factors are a temperature above 28.5° C. and a high humidity. Since the "browning reaction" reduces sporulation, it is important in increasing resistance and regulating the relative abundance of the various physiological races.

1220. BATES, J. C. 633.11:664.641.016
Varietal differences in anatomy of cross-section of wheat grain.

Bot. Gaz. 1943 : 104 : 490-93.

A study of grains of Turkey, Tenmarq, Blackhull, Chieflan and Kawvale wheats.

Turkey, frequently used as a standard in testing varieties, came nearest to representing the average grain in this study of varietal differences.

The percentage cross-sectional area of starchy endosperm—which is determined by the shape, area and combined thickness of the bran and aleurone layers in the cross-section—is an important factor in determining the percentage of flour extraction.

1221. WALDRON, L. R.,
HARRIS, R. H.,
STOA, T. E. and
SIBBITT, L. D. 633.11:664.641.016(78.4)
Protein and quality in hard red spring wheat with respect to temperature and rainfall.

Bull. N. Dak. Agric. Exp. Sta. 1942 : No. 311 : Pp. 20.

Eight varieties of wheat were grown in four separate localities in North Dakota and the protein and quality data analysed. Protein content varied in successive years and was much affected by temperature conditions before and after heading.

1222. D'ANDRÉ, H. 633.11:664.641.016(82)
Calidad industrial de los trigos. Valor medio y variabilidad de los factores que la determinan. Datos de la experimentación oficial de variedades, realizada en distintas regiones, durante el quinquenio 1935/940. (Industrial quality of wheats. Average value and variability of the factors that determine it. Data on the official variety tests carried out in different regions from 1935 to 1940).

"Granos" Semilla Selecta, B. Aires 1940 : 4 : Nos. 5-6 : 3-34.

Observations were made on the 21 varieties at present recommended by the State Seed Tribunal. The variety Klein-Otto Wulff proved to be of exceptionally high baking quality, also Sinvaloch M.A., which gives an exceedingly white loaf and is suitable for use alone as well as in mixtures with less strong wheats. Klein 75 produces dough of unusual tenacity, and Klein-Pirámide is one of the best correcting wheats. Lin Calel M.A., which used to be considered the best in quality, now ranks 9th, not because of any loss of quality but on account of the improvement effected in the recent products of plant breeding, which produce higher and more reliable yields of grain of higher quality. Only slight differences could be detected between the original Lin Calel M.A. and some of the more recent selections from it.

1223. BELMONTE FREIXA, J. 633.11:664.641.016:578.08
Algunos métodos para determinar rápidamente el valor industrial de los trigos. (Certain methods for the rapid determination of the industrial value of wheats).

Arch. Fitotécn. Uruguay 1940-41 : 3 : 276-90.

A detailed description is given of the various forms of apparatus used in the laboratory for estimating wheat quality; certain modifications in the direction of greater simplicity introduced by the author are described.

1224. HARRIS, R. H. 633.11:664.641.016:578.08

New equipment for wheat quality testing.

Bi-m. Bull. N. Dak. Agric. Exp. Sta. 1941 : 4 : No. 1 : 4-6.

HARRIS, R. H. and

SIBBITT, L. D.

Comparative baking quality of wheat starches.

Ibid. 1941 : 4 : No. 2 : 1-6.

HARRIS, R. H. and

SIBBITT, L. D.

A method of "fingerprinting" North Dakota wheat flour in respect to their baking strength.

Ibid. 1942 : 4 : No. 5 : 2-5.

Contained in the first paper is a description of a micro-recording dough mixer, which the North Dakota Agricultural Experiment Station have purchased to assist in determining the milling and baking value of hard red spring wheat varieties.

The second of these papers contains an account of the way in which "synthetic" doughs were made from blends of dried wheat starch and glutens, in order to evaluate the baking quality of starches obtained from different wheats; it was found that loaves baked from red wheat starches were better than those from white wheat starches and that the size of the loaf in the bakings increased with protein level.

In the third paper results of mixing trials, using the new micro-recording dough mixer upon flour milled from some of the hard red spring wheats are recorded, and an account is given of how the resultant loaf volume of a flour can be calculated, with some degree of accuracy, from the mixing curve of the flour following normal fermentation. More extensive experiments using the "synthetic" dough method described in the second paper, substantiate the relationships found between actual loaf volumes obtained from baking the dough and the calculated values.

1225. MCCULLAGH, M. E. 633.11:664.641.016:578.08

Micro milling and baking of small samples of wheat.

Cereal Chem. 1943 : 20 : 185-93.

A micro-method for determining baking quality of wheat is described and its degree of accuracy is compared with that of standard methods.

1226. MERRITT, P. P. and
GEDDES, W. F. 633.11:664.641.016:578.08(77.6)
The complementary baking properties of Minnesota spring and
winter wheat varieties.
Cereal Chem. 1943 : 20 : 98-103.

The authors show the importance of differential baking procedures in evaluating quality and blending properties of flour from different varieties of wheat.

1227. FINNEY, K. F. and
BARMORE, M. A. 633.11:664.641.016:632.422.3:578.08
Yeast variability in wheat variety test baking.
Cereal Chem. 1943 : 20 : 194-200.

The effect of yeast variability on baking quality determinations is described. Yeast may be tested for subnormal efficiency by baking with a standard flour.

1228. FISCHER, G. J.,
GHEORGHIANOV, V. and
LARRIERA, D. G. 633.11.00.14(8)
Ensayos con ocho trigos Uruguayos y catorce trigos Argentinos realizados en
los departamentos de Soriano, Rio Negro, Durazno, Maldonado, Colonia y
Canelones en el año 1938. (Tests with 8 Uruguay wheats and
14 Argentine wheats carried out in the departments of Soriano,
Rio Negro, Durazno, Maldonado, Colonia and Canelones in 1938).
Arch. Fitotécn. Uruguay 1939 : 3 : 111-37.

Arguments are put forward in favour of using rather larger plots than are possible with a Latin square for tests of the agricultural merits of a set of varieties. It was decided to adopt two sets of tests, the first in quintuplicate with small plots and the second in triplicate with larger plots.

Information is given regarding the reaction to rust and smut, yield, hectolitre weight, ratio of grain to straw, average grain weight and Pelshenke fermentation time for the varieties sown at a number of different times. The varieties Pelón plateado, Litoral precoz and Pirámide were among the most outstanding.

OATS 633.13

1229. STANTON, T. R. 633.13:575(73)
Registration of varieties and strains of oats, XII.
J. Amer. Soc. Agron. 1943 : 35 : 242-44.

DeSoto (Reg. No. 101) is a midseason yellow oat selected from the cross Lee x Victoria. It does not lodge under average conditions, has a higher average yield than Lee or Ferguson and is resistant to crown rust, smut and cold. Bridger (Reg. No. 102) is from the cross Markton x Victory, a combination that has already produced Bannock and Huron. Bridger is a tall mid-season to late white variety of the *sativa* type. It is resistant to lodging and smut and yields satisfactorily. R. M. I.

1230. STOA, T. E. and
SWALLERS, C. M. 633.13:575(78.4)
Varieties of oats for North Dakota.
Bi-m. Bull. N. Dak. Agric. Exp. Sta. 1942 : 4 : No. 3 : 24-30.
STOA, T. E. and
SWALLERS, C. M.
New varieties of oats for North Dakota.
Ibid. 1943 : 5 : No. 3 : 17-22.

Both papers contain brief descriptions of the commonly grown and newer oat varieties; the results of oat varietal tests in North Dakota during 1941 are given in the first paper while the second paper gives the results of similar tests in 1942. In both cases, the yields are compared with those given by the varieties in previous years.

1231. SCHLEHUBER, A. M.,
 STURM, J. J. and
 BAMBERG, R. H.
Oat variety tests in Montana.

633.13:575(78.6)

Bull. Mont. Agric. Exp. Sta. 1942 : No. 399 : Pp. 20.

Notes are given on the main characteristics and the origin of each oat variety included in the tests which took place on non-irrigated land at three stations and on irrigated land at one station in Montana, during the years 1930 to 1940.

The data, which show the performance of each variety compared with that of a standard variety during the years it was tested at the different stations, indicate that different varieties of oats must be recommended for irrigated and non-irrigated land; Victory and Bridger are recommended for irrigated land; Bridger is a new station variety selected from the cross Markton x Victory, and similar to Victory in yield and in plant and grain characteristics but resistant to most physiological races of smut to which Victory is susceptible and having more resistance to lodging; Gopher is recommended for dry or non-irrigated land.

New oat varieties resistant to smut and rust, which have been tested in Montana, are mentioned. Of these Marion shows some promise.

1232. CARQUÉ, E.

633.13:575.242

Orígen y propagación de la avena loca. (Origin and propagation of *Avena fatua*).

Agricultura, Madrid 1943 : 12 : 69-70.

The origin of *A. fatua* is ascribed to mutation from *A. sativa* and measures are suggested for preventing its spread.

1233. STANTON, T. R.

633.13-2-1.521.6:581.6(73)

That "someday" is today for oat breeders.

Sth. Seedsman 1943 : 6 : No. 5 : 9, 45, 48.

New disease-resistant varieties of oats are discussed with reference to their suitability for planting by growers in the southern states.

1234. MURPHY, H. C. and

BURNETT, L. C.

633.13-2.45-1.521.6(77.7)

More oats, fewer acres!

Fm Sci. Reporter 1943 : 4 : No. 1 : 6-7.

The new crown rust and smut resistant oat varieties: Tama, Boone, Marion and Control, are discussed and compared with older varieties in Iowa.

1235. REED, G. M.

633.13-2.451.2:576.16:631.521.6:575.12(74.7)

Reports on research for 1942. Plant pathology.

Brooklyn Bot. Gdn Rec. 1943 : 32 : 75-78.

The behaviour of oat varieties towards the new race of loose smut attacking Victoria has been investigated. Resistant selections have been obtained from Victoria x Richland, Victoria x Nortex and Victoria x Fulgrain; all strains from Victoria x Lee and Victoria x Hairy Culberson were susceptible.

Analysis of the progeny from a cross between Victoria and Monarch suggests that resistance is controlled by a single gene. The races obtained from hybridizing race I of loose smut and race I of covered smut are described.

1236. WILLIAMS, M. F.

633.13-2.452-1.521.6:575.12

Out of the Bayou Country . . . Camellia oats.

Sth. Seedsman 1943 : 6 : No. 6 : 11, 38.

The new variety Camellia (formerly known as Louisiana 629 hybrid oats) is described. It is derived from Bond x Alber and in addition to desirable agronomic qualities it has a greater resistance to crown rust than either Bond or Victoria.

1237. POEHLMAN, J. M.

633.13.00.14(77.8)

Growing good crops of oats in Missouri.

Bull. Mo. Agric. Exp. Sta. 1942 : No. 439 : Pp. 12.

The yields of the two early-maturing varieties Columbia and Fulghum are compared.

RYE 633.14

1238. PRAKKEN, R.

Studies of asynapsis in rye.

Hereditas, Lund 1943 : 29 : 475-95.

The cytology of an asynaptic strain of rye is described. Pachytene pairing is regular but abnormal behaviour becomes apparent at late diplotene. Chiasmata tend to be terminal and at metaphase many of the pairs dissociate: consequently, the chromosomes tend to segregate at random and few viable gametes are produced. Differences in the degree of asynapsis can be correlated with environmental humidity. The character is controlled by a single recessive gene and the heterozygotes are quite normal.

MAIZE 633.15

1239.

633.15:575(77.7)

633.15-2 : 575.242:631.521.6:575.116.4:581.6

Report on agricultural research for the year ending June 30, 1942.

7th Rep. Ia Corn Res. Inst. Agric. Exp. Sta. 1942 : Pt II : Pp. 85.

Varietal trials for maize, sweet-corn and pop-corn are reported.

Waxy 939 is a new variety with waxy endosperm; it was obtained from crossing an inbred line of Iowa 939 with a Chinese waxy variety and then back-crossing the hybrid with Iowa 939 for three generations. The yield is 10% lower than that of Iowa 939 and the milling quality is poor.

A statistical analysis of the relative importance as regards yield of specific and general combining abilities is reported, also an analysis of mild inbreeding techniques involving an alternation of selfing and sib-crossing.

Eleven different genes for glossy seedling have been distinguished of which Glossy 1, 2, 3 and 4 are the most frequent; some were formed after X-ray and ultra-violet treatments. Yellow endosperm has been assumed to depend on the interaction of only one or two factors but the difficulty of transferring this character to white inbred lines or vice versa suggests a more complex situation. An attempt is being made to transfer "yellow scutellum" to standard lines as this character causes an increase in the β -carotene content of the grain. Chromosome map distances have been calculated for the following genes:

gs_2	b	$lg.$
4.8	28.4	

Maize is being bred for resistance to *Diplodia*.

The behaviour of *Phytoponas Stewartii* in culture has been investigated. A number of "mutants" were produced but the incidence of these bore little relation to the pH or glycine content of the media; "mutants" were usually less virulent than the original form.

1240. WIIDAKAS, W.

633.15:575(78.4)

Early North Dakota corn hybrids.

Bi-m. Bull. N. Dak. Agric. Exp. Sta. 1942 : 4 : No. 4 : 13-15.

The results of maize varietal trials undertaken in North Dakota for a number of years up to 1941 are discussed.

Hybrid varieties have been superior to open-pollinated varieties and some of the double cross early yellow dent maize hybrids produced at the North Dakota Agricultural Experiment Station are of value for growth in certain parts of the state. The foundation single cross seed stock for the production of four of the North Dakota experimental hybrids is being released; the times of maturity, relative to those of standard open-pollinated varieties, of the new hybrid groups, and the pedigrees of these four new hybrids, are listed.

1241. BOERGER, A.,

CANEL, M. and

BURDENSKI, D.

633.15:575(8)

Investigaciones con maiz efectuadas en La Estanzuela desde 1934-35 a 1938/39. (Investigations on maize carried out at La Estanzuela between 1934 and 1939).

Arch. Fitotécn. Uruguay 1939 : 3 : 186-229.

Using the variety Cuarentón-La Estanzuela as standard, a comparison was made of the yielding ability of a number of Uruguayan and Argentine maize varieties, tested at a number of different sowing dates. Many of the Argentine varieties quickly proved inferior and were

eliminated. The variety Amarillo La Estanzuela was undoubtedly the best. Several varieties exceeded the standard in good years but in less favourable years the differences tended to disappear. Hybrid seed from Argentina gave good results but did not equal Amarillo La Estanzuela. Many varieties and hybrids introduced from a number of other countries proved entirely unsatisfactory; this applied to all but 8 of a collection of 46 starchy maizes imported from the U.S.A. for industrial purposes.

There is a discussion of Amargo maize and of the various hypotheses put forward to explain its resistance to locust attack. Observations during a number of years of severe attack have confirmed this resistance, though the variety is too late and too irregular in maturity for the needs of the local maize growers. A collection was made of Amargo maize from a number of different sources and tests made with 15 of them showed considerable differences in yielding ability under Uruguayan conditions.

Points for and against the employment of hybrid seed obtained from crossing inbred lines are discussed. It has not been possible in Uruguay to self the lines for more than a few generations without losing them. Hybrids were produced by crossing various existing varieties and significant increases over the yield of the standard were obtained in 4 out of 6 of the hybrids. The superiority of the hybrids was more evident in the later sowings.

Certain differences between the varieties were noted in protein, starch and oil content of the grain.

1242. 633.15:575.12
634.75:581.6:575(76.8)
HOSKINS, J. D.
**Fifty-third Annual Report of the Agricultural Experiment Station
of the University of Tennessee, for 1940 (1941)** : Pp. 110.

A maize field trial showed that the three hybrid types Tennessee Hybrid 15, Tennessee Hybrid 10 and Funk Hybrid G 125 were superior to the standard variety Foundation Neal Paymaster. Two strawberry varieties have proved outstanding: Tennessee No. 260 (Tennessee Supreme) in freezing tests, and Tennessee No. 148 in transport tests.

1243. 633.15:575.12(73)
635.67:575.12:632.3-1.521.6(73)
Sweet corn for canning.
Publ. Nat. Canners Assoc. 1941 : Pp. 60.

This symposium contains a great deal of information on the sweet corn varieties at present used or under trial in the various American states. There is a general desire to extend the length of the canning season by the introduction of early, middle and late maturing varieties adapted to the climates of each state. Golden Cross Bantam is the most popular variety in South Carolina, Maryland, Minnesota, Ohio, Wisconsin and New York, although it is pointed out that it should be possible to produce hybrids both with increased yield and greater disease resistance. In Maine and Massachusetts this variety matures rather late and in the latter state, strains of the useful varieties Marcross and Spancross are being used in addition. Local strains of Golden Bantam and a number of top crosses are proving most suitable for growth in Maine. Joana and Iogold A both outyield Golden Cross Bantam in Iowa.

Golden Stowells, a new hybrid derived from inbred lines C53 and C65, is being introduced in Connecticut. Indiana has produced a new single cross hybrid No. 1406 derived from 39 C x P 14 and this is superior to Golden Cross Bantam, both in yield and in cutting percentage. It has also been found that Golden Sunshine inbred No. 28 is highly resistant to bacterial wilt (*Aplanobacter Stewartii*) and it is being used in the attempt to produce resistant varieties of commercial value.

Cherokee, a hybrid between sweet and dent corn, has been found useful in Georgia and has the long close-fitting husk necessary for success against ear worms and weevils.

1244. JENKINS, M. T. 633.15:575.12(73)
**Results of the cooperative uniform comparisons of corn hybrids
1942.**
Bur. Pl. Industr. Sta., Beltsville, Maryland, U.S.D.A. 1943 : Pp. 97. (Mimeo-
graphed).

A full account of hybrid maize tests made by the American Bureau of Plant Industry in co-operation with 22 state experimental stations is presented. Comparative tests have been

made with early mid-season and late, yellow, single crosses and southern top crosses. Predicted yields of double crosses are also included.

1245. HARVEY, P. H. and
MIDDLETON, G. K. 633.15:575.12(75.6)

The performance of corn hybrids in North Carolina.

Agron. Inform. Circ. N.C. Agric. Exp. Sta. 1940 : No. 124 : Pp. 12. (Mimeo-graphed).

Field tests have shown that hybrid maize seed from Corn Belt and northern hybrids is ill-adapted for use in North Carolina. The hybrids mature too early, develop poor grain and are seriously infested by weevils. Farmers should continue to use local varieties.

1246. SPRAGUE, G. F. 633.15:575.12(77.7)

Production of hybrid corn.

Bull. Ia Agric. Exp. Sta. 1942 : No. P48 : 556-82.

An account is given of the general methods used in breeding maize and yield figures for some of the more recent Iowa varieties are given.

1247. ANDERSON, D.C.,
McHONEY, L. L. and
POWELL, R. E. 633.15:575.12(77.8)

1941 report of the yield trials with corn hybrids and varieties in Missouri.

Manual Agric. Ext. Serv. Univ., Mo., 1942 : No. 24 : Pp. 23.

For the purpose of these trials the state was divided into three regions from north to south with five tests planted in each region.

The results are given as the yield in bushels per acre, moisture percentage, lodging percentage and ear height in inches for each hybrid or variety in the tests. Tables are also given showing the yields of entries which have been in the tests for two or more years and the pedigrees of the Experiment Station and United States hybrids included in the tests.

1248. ANDRÉS, J. M.,
BASICALLI, P. C. and
LOTTI, A. 633.15:575.12(82)

Híbridos comerciales de maíz. Resultados de las experiencias realizadas en el año agrícola 1940-41. (Commercial maize hybrids. Results of experiments carried out in the agricultural year 1940-41).

J. Agron. Vet. 1941 : Pp. 15.

In continuation of previous work (cf. "Plant Breeding Abstracts", Vol. XIII, Abst. 146) data are given regarding the performance in 1939-40 and 1940-41 of 40 hybrids and of two double crosses obtained from the U.S.A. The variety Colorado Manfredi M.A. was used as standard and the best hybrid exceeded it by 49% in yield; 12 of the hybrids were significantly above the standard. Almost all these were obtained by crossing a local strain with a North American strain and hybrids between two local strains were mostly either equal or inferior to the standard. The two double crosses, though good, were not among the best and suffered severely from fungus and insect attack.

The hybrids all yield rather less flinty grain than the local strains but are suitable for local consumption.

1249. O'MARA, J. G. 633.15:575.127.5:576.354.4:576.356.2

A cytogenetic study of Zea and Euchlaena.

Res. Bull. Mo. Agric. Exp. Sta. 1942 : No. 341 : Pp. 16.

Direct analysis of a maize x Florida teosinte hybrid at pachytene proved impossible owing to clumping of chromosome knobs. It was found, however, that at pachytene the hybrid between maize and Nojoya teosinte showed no chromosome rearrangements and had chromosome pairing as close as in a pure species. Nojoya teosinte was therefore used in a cross with Florida teosinte, the cross being used for an indirect analysis of the maize x Florida teosinte hybrid.

At metaphase maize x Florida teosinte showed in a proportion of cells 2 or 4 unpaired chromosomes, each pair clearly heteromorphic. A maximum of two bridges and fragments was found at metaphase, and an inversion was found twice in one of the longer chromosomes at pachytene when such a chromosome happened to lie clear of the tangle of threads normally found.

In the Florida x Nojoya teosinte hybrid, pachytene analysis showed that, with respect to maize, Florida teosinte had a rearrangement on the end of the long arm of chromosome 4, another in the long arm of chromosome 8 and an inversion in the distal half of the short arm of chromosome 9.

The existence of this inversion in chromosome 9 was confirmed genetically by showing that in maize x Florida teosinte there is practically no crossing-over in the C-x interval, whereas in maize x Nojoya teosinte crossing-over was normal, averaging 18.4%.

It is considered likely that the heteromorphic nature of the chromosomes in Florida teosinte x maize was due to the fact that in each case the teosinte homologue had a large terminal knob. There is evidence that as the chromosome contracts, the thread portion does so more rapidly than the knob, so that chromosomes with knobs will be much longer at metaphase than those without.

S. E.

1250. KADAM, B. S. 633.15:576.356.5:576.356:581.162.5

Chromosome studies in relation to fertility and vigour in inbred and open-pollinated strains of autotetraploid maize.

Abstr: Thes. Cornell Univ. Pr. Ithaca, N.Y. 1941 : 338-41.

A fertile open-pollinated line of autotetraploid maize ($2n = 40$) has been maintained for eight generations and compared cytologically with an inbred fertile line and an inbred sterile line. The meiotic behaviour of all three lines is very similar and it does not appear possible to attribute the sterility usual in autotetraploids to chromosomal aberrations.

The chromosome numbers of the progeny of all the lines vary from 36-43 with a mode at 40 comprising 60% of the plants. Meiosis is similar in all the lines with a range of 5-10 tetravalents appearing at metaphase I; in all cases the mode is at 8. There is a slight tendency for the open-pollinated and sterile lines to form fewer tetravalents and for the fertile inbred lines to form more. Microspores have 14-24 chromosomes with a mode at 20, and the progeny of 40-chromosome plants includes an average of 40% aneuploids. The latter produce fewer quadrivalents at meiosis and tend to form trisomic microspores. Plants with 38 and 41 chromosomes produce microspores whose chromosome numbers show a mode at 20 while plants with 38 and 39 chromosomes produce microspores with a bimodal distribution of chromosome numbers. The 41-chromosome plants have a tendency to produce pentasomics. No significant difference in vegetative vigour could be observed between plants with 38, 39, 40 and 41 chromosomes but a distinct reduction in vigour was noted in plants with 42 chromosomes. Plants with 40 and 31 chromosomes were equally fertile while those with 38 were less fertile and those with 39 less still.

The fact that the progeny of tetraploid maize lines exhibit a range of chromosome numbers of 36-43 instead of the hypothetical 28-48 may be due to non-functional eggs with the extreme chromosome numbers or to non-viable zygotes.

There is no evidence to suggest that autotetraploid lines become cytologically uniform in a few generations. It is possible that, without a mutation affecting meiosis, a tetraploid line may continue to exhibit chromosomal aberrations indefinitely.

1251. DOTY, D. M.,
BERGDOLL, M. S. and
MILES, S. R.

633.15:581.6:581.02(77.2)

The chemical composition of commercial hybrid and open-pollinated varieties of dent corn and its relation to soil, season, and degree of maturity (a preliminary report).

Cereal Chem. 1943 : 20 : 113-20.

The grain of 40 varieties and hybrids of dent corn was analysed for protein, fibre and ash content. Significant variations were found depending on seasonal changes, locality and soil; no significant differences occurred between the varieties.

1252. HAYES, H. K.,
MURPHY, R. P. and
RINKE, E. H.

633.15-1.557:519.24

A comparison of the actual yield of double crosses of maize with their predicted yield from single crosses.

J. Amer. Soc. Agron. 1943 : 35 : 60-65.

Using Jenkins' method B, i.e. averaging the yields of four of the six possible single crosses from

any four inbred lines but not using the two single crosses used as parents of a particular double cross, a comparison was made of the relative yields of selected double crosses based on prediction data obtained by method B during one season and the performance of the same double crosses in later seasons, and secondly a comparison of actual yields of double crosses and their predicted yields from single crosses grown with double crosses. The results of a comparison of the yield and moisture content showed that the method is satisfactory for the prediction of the actual yield of a double cross.

R. M. I.

1253. TATUM, L. A. 633.15-2.111-1.521.6:575.12:581.142
The effect of genetic constitution and processing methods on the ability of maize seed to germinate in cold soil.

J. Sci. Iowa St. Coll. 1942 : 17 : 138-40.

Some maize samples when planted in cold wet soils give poor stands while others are not affected. Laboratory tests in wet soil at 45° F. showed that samples that germinated poorly had a high percentage of grains with pericarp damaged during processing, and were consequently more subject to attack by pathogens during germination. Tests were made of all possible reciprocal single crosses among the inbreds: II 198, I233, L289, L137, 187-2, Hy, WF9 and 38-11 and of the inbreds themselves; significant differences in resistance to the damp cold conditions were observed between strains but appeared to be due more to the condition of the seed than to hereditary differences. There were however significant differences between reciprocals of single crosses, showing that some lines are better seed parents than others; 38-11 was an outstandingly poor seed parent and L289 and Hy were relatively good. In nearly all cases the parental inbreds germinated less well than the single crosses, though there was no correlation between vigour and germination in the cold test. Three-way crosses showed that R4 transmitted more resistance than did I234.

1254. ELLIOTT, C. 633.15-2.484-1.521.6:575.12
***Helminthosporium turcicum* leaf blight of inbred lines and crosses of dent corn in 1942.**

Div. Cereal Crops Dis., Bur. Pl. Industr., U.S.D.A. 1943 : Pp. 8. (Mimeo-graphed).

Varietal resistance of inbred lines and hybrids of dent corn to *H. turcicum* is recorded. Open-pollinated varieties show, on the whole, less susceptibility.

BARLEY 633.16

1255. HAYES, H. K. 633.16:575(73)
Barley varieties registered, VIII.

J. Amer. Soc. Agron. 1943 : 35 : p. 240.

Santiam, a six-rowed selection from Composite Cross C.I.5530, is described; it has a winter type growth habit and is high yielding and winter-hardy under the conditions of Western Oregon.

R. M. I.

1256. HARLAN, H. V., MARTINI, M. L. and STEVENS, H. 633.16:581.162.32:581.036:578.08(79.6)
The effect of temperature on seed set in barley crosses.

J. Amer. Soc. Agron. 1943 : 35 : 316-20.

The effect of temperature on the proportion of seed set in barley crosses is discussed. At Aberdeen, Idaho, high temperature causes pollen to mature at an early stage in the development of the spike. The early emasculation necessary frequently injures the young spike, and reduces the number of seeds set.

1257. STOA, T. E. 633.16:581.46:575(78.4)
A new variety of barley—Tregal.

Bi-m. Bull. N. Dak. Agric. Exp. Sta. 1943 : 5 : No. 3 : 25-26.

A new barley variety named Tregal has been released by the North Dakota Agricultural Experiment Station. The variety is a selection from a cross between Trebi and a smooth awned variety, Regal, made at the station in 1931.

Tregal resembles Trebi in having a high yield, relatively short straw and matures at the same

Barley 633.16 *continued.*

time. It differs from this variety in having slightly stronger straw and a shorter and smaller white kernel; most of the plants are smooth awned. Until more information on its malting quality is available, Tregal should be regarded primarily as a fodder barley.

1258. MIDDLETON, G. K.,

CHAPMAN, W. H.,

McMILLEN, R. W.,

HENDRICKS, J. W. and

COLVARD, D. W.

633.16-2.451.2-1.521.6(75.6)

Winter barley in North Carolina.

Bull. N.C. Agric. Exp. Sta. 1942 : No. 336 : Pp. 19.

After field trials for a period of eleven years it was found that Iredell and Davidson were both high yielding and resistant to *Ustilago nuda* and some races of *U. Hordei* and *U. nigra*. The awnless variety Sunrise gave the maximum yields but although resistant to mildew it is very susceptible to *U. nuda*.

1259. IMMER, F. R.

CHRISTENSEN, J. J. and

LOEGERING, W. Q.

633.16-2.452-1.521.6:576.16:578.08(73)

Reaction of strains and varieties of barley to many physiologic races of stem rust.

Phytopathology 1943 : 33 : 253-54.

Using 4 varieties and 20 hybrids of barley, the authors show that seedling and adult susceptibilities to 19 races of *Puccinia graminis* *Tritici* and to one collection of *P. g. Secalis* correspond. Seedling reaction, therefore, can be used when selecting barley for rust resistance.

MILLETS AND SORGHUM 633.17

1260. STANSEL, R. H.

633.174:575(76.4)

Humidity holds no terror for this kafir.

Sth. Seedsman 1942 : 5 : No. 10 : 12, 36.

Schrock, which was selected from a hybrid of unknown parentage in 1912, has proved the outstanding grain sorghum variety during tests over a period of 14 years at Angleton in Texas where it is particularly well suited because of its high resistance to midge and bird damage. The plant is medium late, suckers moderately, has a sweet stalk, a straight head of the open loose type and a tight glume which is difficult to remove in threshing; the seeds are brown, with a waxy endosperm and a high tannin content; the variety does not shatter easily and so the heads can be harvested after they have become dry enough to keep in storage. Sagrain is a selection from Schrock and is practically identical with its parent.

1261. QUINBY, J. R. and

KARPER, R. E.

633.174:575.127.2:633.282

Sweet Sudan is a comer . . . and then some !

Sth. Seedsman 1943 : 6 : No. 4 : 11, 39.

Sweet Sudan grass is the result of a successful combination of the desirable characters of Sudan grass and the sweet sorghum variety Leoti, brought about by crossing, backcrossing and selection, over a period of several years, by the Texas A.E.S. in co-operation with the Bureau of Plant Industry.

The new variety possesses the sweet and juicy stem, the distinctive sienna glume colour and the resistance to shattering of the Leoti parent, together with most of the resistance to the foliage diseases of this sorghum, combined with the growth habit and production of the common Sudan grass; breeding is being continued for improvement in resistance to foliage diseases, but meanwhile, some distribution of foundation seed stock is taking place.

1262. MELCHERS, L. E. and

HANSING, E. D.

633.174-2.451.2:581.143

The effect of sorghum kernel smuts on the development of the host.

J. Agric. Res. 1943 : 66 : 145-65.

Experiments were made to determine the morphological changes in the sorghum host plant caused by infection from *Sphacelotheca Sorghi* (Ik.) Clint. and *S. cruenta* (Kühn) Potter. A

number of varieties, selections and hybrids of sorghum were used in the experiments as well as the two races of both smuts. It may be of interest to plant breeders that the data on height of plant, diameter of stalk and width of leaf show sorghum varieties react in different ways to the two smuts.

R. M. I.

1263. SWANSON, A. F. and LAUDE, H. H. **Sorghums for Kansas.** Bull. Kans. Agric. Exp. Sta. 1942 : No. 304 : Pp. 63. A detailed account of the history, yield and quality of the varieties of Sorghum grown in Kansas is presented together with the results of recent varietal tests.

RICE 633.18

1264. JODON, N. E. **Advances toward new and improved rice varieties.** Bienn. Rep. Rice Exp. Sta., Crowley, La 1939-40 : 20-24.

The rice improvement programme carried out each year at the station includes work on hybridization and selection and tests of the most promising strains to obtain information on time of maturity, type of growth, disease resistance, lodging, field yield, relative milling quality and cooking quality.

A report is given on some hybrid selections made in other states but tested at Cowley; these are from the crosses Edith x Fortuna, Colusa x Blue Rose, Improved Blue Rose x Fortuna and Kameji x Blue Rose.

Promising station hybrid selections are described and these include certain selections from the crosses Iola x Blue Rose, Nira x Blue Rose, Rexoro x Fortuna, Fortuna x Nira and Rexoro x Delitus. In addition the Blue Rose x Rexoro hybrid has been back-crossed to both parents, with the object of obtaining superior selections of the Blue Rose and Rexoro types.

FORAGE GRASSES 633.2*

1265. **Sixth Annual Report of the U.S. Regional Pasture Research Laboratory.** State College, Pa 1942 : Pp. 113. 2 figs. (Mimeographed).

Cytological and genetical work has been done with the following species: *Dactylis glomerata*, *Lolium perenne*, *Agrostis* spp., *Festuca elatior*, *Sorghum vulgare* var. *sudanense* and clover.

1266. MYERS, W. M. **Second generation progeny tests of the method of reproduction in Kentucky bluegrass, *Poa pratensis* L.** J. Amer. Soc. Agron. 1943 : 35 : 413-19.

Second generation progeny tests are recommended for distinguishing between sexual and apomictic strains of *Poa pratensis*, the degree of variance between the parent and the progeny being the criterion used. Müntzing's theory that apomixis is determined by a balanced "constellation of genes" is supported, although it is pointed out that apomicts may arise from highly sexual parents, presumably by the secondary recombination of the genes concerned.

1267. NEWELL, L. C. and KEIM, F. D. **Field performance of bromegrass strains from different regional seed sources.** J. Amer. Soc. Agron. 1943 : 35 : 420-34.

Field tests have shown that American strains of *Bromus inermis* may be classified in two groups, a northern type and a southern; these types differ in their physiological adaptation to latitude. It is concluded that the variability in the species has resulted from selection both before and after its introduction into the U.S.A.

*See also Abst. 1263.

Forage Grasses 633.2 *continued.*

1268. COOK, C. W. 633.262-2.112:581.43(79.2)
A study of the roots of *Bromus inermis* in relation to drought
resistance.
Ecology 1943 : 24 : 169-82.

The importance of studying the root system of forage grasses when selecting for drought resistance is stressed. In the case of *B. inermis*, significant differences between resistant and non-resistant strains are observed in the "total axial root length".

1269. BURTON, G. W. 633.266:575.127.2
Interspecific hybrids in the genus *Paspalum*.
J. Hered. 1943 : 34 : 15-23.

An interspecific male sterile hybrid of Vasey grass, *Paspalum Urvillei* Steud. (V), x *P. malacophyllum* Trin. (M) was found and crosses made to Vasey and Dallis grass, *P. dilatatum* Poir. (D). Details are given of the resulting hybrids. One V x M hybrid had a prostrate habit of growth and spread much faster than other grasses used for comparison. There was considerable variation in dry matter production and the seed production of the hybrids was lower than that of the parents. Some of the V x M hybrids appeared to be immune to ergot, a serious disease of Dallis grass, and both (V x M) x D and (V x M) x V hybrids showed more resistance than Dallis. Data are also given on the frost resistance and tolerance of the hybrids to heat, drought and flooding. The V x M hybrids had 40 somatic chromosomes like the parents. Most of the (V x M) x D hybrids examined had $2n = 60$ like the (V x M) x V hybrids but some hybrids of the first cross showed more than 60.

The hybrids apparently reproduce themselves by some form of apomixis.

R. M. I.

LEGUMINOUS FORAGE PLANTS 633.3*

1270. TYSDAL, H. M., 633.31:575(73)
KIESSELBACH, T. A. and
WESTOVER, H. L.
Alfalfa breeding.

Res. Bull. Neb. Agric. Exp. Sta. 1942 : No. 124 : Pp. 46.

The object of the publication is to bring together available information regarding improvement of *Medicago*, and to add suggestions for further research. The new data reported have been obtained through a co-operative alfalfa breeding programme conducted jointly by the Nebraska Agricultural Experiment Station and the Division of Forage Crops and Diseases, Bureau of Plant Industry, U.S. Department of Agriculture.

The bulletin contains information under headings which include: (1) basic considerations of interest in breeding (amount of natural crossing, performance of selfed lines and of hybrids, variability of inbred lines, hybrids and varieties); and (2) improvement methods (mass selection, recombination of selected inbred lines as synthetic varieties, developing lines for recombination).

It is concluded that the principles of breeding alfalfa, with some modifications, are essentially the same as those which have been established for maize. A programme is outlined for the development of either a hybrid or a superior synthetic variety (the progeny from the open-pollinated seed of mixtures of inbred lines or of hybrids between them).

1271. 633.31-2-1.521.6:575(79.2)
Results of station research have practical applications to war emergency agricultural production problems.

Fm Home Sci., Utah 1942 : 3 : No. 4 : 6-8, 10.

A new wilt resistant alfalfa variety is mentioned. This variety is more resistant to cold than the ordinary varieties grown in Utah and is highly productive. Should the variety continue to show superiority it will be released for general production in the state.

ROOTS AND TUBERS 633.4

1272. CARSNER, E. 633.63-2.8-1.521.6:575(73)
The story of blight-resistant beet seed.
U. and I. Cultiv., Utah 1941 : 1 : No. 3 : 5-6.
JENSEN, M.
Our part in the resistant seed development.
Ibid. 1941 : 1 : No. 3 : 9-10.

* See also Abst. 1265.

In the first paper an account is given of the investigations which resulted in the breeding of the present commercial sugar beet seeds which carry resistance to the curly top virus transmitted by *Eutettix tenellus*.

The first resistant seed, U.S. No. 1, was of great value but was only partially resistant and had poor yielding qualities and a tendency to bolt. Breeding for increased resistance tended further to reduce the yield of beet per acre and sugar contents of the individual beets, as compared with high yielding European types grown free from the disease.

A great advance was made when it was discovered that sugar beet seed could be grown from the new resistant seed in one season by utilizing the tendency to bolting shown by some of the new resistant plants; but bolting again reduced the yield and sugar content. These new difficulties were also successfully overcome.

A number of resistant varieties are now in use, each suited to the area in which it is grown and improvement in yielding qualities and reduced tendency to bolting can be expected in the future.

Included in this article are the results, in yield of sugar beet in tons per acre, of a varietal test in Idaho of the varieties U.S. Nos 1 to 5 compared with German seed; Nos 1 to 5 show a progressive increase over the German variety.

The second paper states that the Department of Agriculture have released five principal strains, U.S. Nos 1, 33, 34, 12 and 22. The last variety released, U.S. No. 22, has shown good yielding qualities and a high degree of resistance.

1273. DREWES, H. 633.41:575(73)

Something new has been added to beets.

Sth. Seedsman 1942 : 5 : No. 10 : 10, 31, 35.

The article contains a review of many of the older and improved table beet strains grown in the U.S.A. The strains introduced by the Ferry-Morse Seed Co. are described and amongst them are the Green Top Bunching variety, selected from Crosby Egyptian, and the Green Top Early Wonder variety, selected from Early Wonder, which have short or medium sized green tops with more resistance to wet or cold weather than those of their parents. The roots of these two varieties are almost round and of good quality and colour.

1274. KRANTZ, F. A., 633.491:575(73)
 TOLAAS, A. G.,
 WERNER, H. O.,
 GOSS, H. W. and
 JENSEN, J. H.
The Kasota potato.

Amer. Potato J. 1943 : 20 : 25-27.

A description is given of a new variety of potato introduced by the Agricultural Experiment Stations of Minnesota and Nebraska. A seedling from the cross Silverskin x Keeper was crossed to a seedling reported to be from Early Ohio, and a selection from this cross back-crossed to Triumph. Kasota was selected from the progeny. It is a red potato with cooking quality equal to or better than Katahdin and Chippewa, and somewhat more resistant to stem end rot and late blight than the commonly grown varieties. Damage from scab may be less. Maturity is earlier than Chippewa and later than Triumph and Cobbler. C. M. D.

1275. HARDENBURG, E. V. and 633.491:575.12:581.6
 STEVENSON, F. J. 633.491-2-1.521.6

Mohawk: a new baking potato.

Amer. Potato J. 1943 : 20 : 79-86.

Tests with the new Mohawk variety of potato (a selection from the cross Green Mountain x Katahdin) made in New York state have shown a combination of good yield with high baking quality. Although susceptible to leaf-roll, it has not shown net necrosis nor is it susceptible to mild mosaic. Its resistance to tip burn, flea-beetle injury and hopper-burn is described as moderate.

1276. *FILIPPOV, A. S. 633.491:575.257:575.127.2
(Interspecific and intraspecific vegetative hybridization of potatoes).
 Vestnik Ovoševodstvo i Kartofel' (Vegetable and Potato Journal) 1940 :
 No. 2 : 16-39.

* An extended summary of this paper is on file at the Bureau.

The literature of graft hybrids is reviewed and the author's method of making potato grafts is described. When *S. acaule* and *S. demissum* were grafted on to *S. tuberosum* they assumed many of the characters of the domestic forms, whilst the reciprocal grafts caused the domestic varieties to vary in the direction of the wild forms. Grafts of one domestic variety on to another also produced an alteration in the habit of the scion variety. Short-day species such as *S. demissum* and *S. acaule* on which early varieties such as Epicure or Early Rose had been grafted formed tubers in ordinary long days at about the same time as the respective domestic varieties themselves. Plants from three of the intervarietal grafts were again grafted with the same scions in the following year and the effects were more pronounced still after the second treatment. Sometimes tubers from a grafted plant, themselves not differing much from the parent, gave rise to plants showing marked differences and referred to as vegetative hybrids.

Seedlings of *S. acaule* about 20–22 days old were grafted on to 35–40 day old plants of Early Rose on which the tubers and the 2–4 lower leaves were allowed to remain. After a few days the *S. acaule* plants began to deviate in the direction of Early Rose and 110–115 days after grafting they were 100 cm. high. The three best plants were chosen and 17 flowers were pollinated with Smyslovskii (Fürstenkrone); 7 berries were obtained, 4 of which contained small inviable seeds; one good fruit with viable seeds was obtained from each graft. About 500 pollinations of 27 ungrafted plants of *S. acaule* by Fürstenkrone produced seedlings of the pure maternal type only.

The fruit from the first grafted plant produced 15 seedlings, 4 of which were hybrids and 11 of the maternal type. The fruit from the second plant gave 3 seedlings, all hybrids, and that from the third gave 2 plants differing morphologically. Among the 9 hybrid seedlings there appeared various new characters not present in either of the parents. All the hybrids had the same chromosome number (48) but differed in frost resistance; one hybrid withstood a temperature of -5° C. and yielded 600 grm. of tubers per plant.

By using the same method hybrids were obtained from *S. tuberosum* x *S. demissum*, a cross that has previously been possible only in the reciprocal direction. The hybrids all had 60 chromosomes but differed in flower colour, length of stolons, tuber formation, blight resistance, etc.

Plants of *S. semidemissum* were grown for 20 days at a temperature of $10-15^{\circ}$ C. in a 10–12 hour day during which time all the flowers and flower buds were removed. The flowers that developed subsequently were pollinated with Fürstenkrone and in this way 13 seeds were obtained. The seed coat was cut from 15 of these seeds, all of which gave rise to hybrid seedlings. The hybrids segregated and some were immune to *Phytophthora* and some to frost resistance. The hybrids were fertile and crossed easily with *S. tuberosum*, as did the hybrids of *S. acaule* x Fürstenkrone.

1277. TKAČENKO, P. I. 633.491:575.42:581.165.1
(**Clonal selection in potatoes**).

Vestnik Ovočevodstvo i Kartofel' (Vegetable and Potato Journal) 1940 :
No. 2 : 63–66.

Old varieties such as Wohltmann and Early Rose have been found to be far from uniform, consisting of a number of clones differing in earliness, yield and starch content. Wohltmann, though a popular variety, ripens too late for the more northerly areas but some of the clones selected from it mature earlier and yield better than the unselected varieties, their average yield per plant being 328 grm. as compared with 236 grm. for the unselected plants.

Earlier clones of Early Rose and clones of Wohltmann with higher starch content were also obtained by selection. Forms with short haulms were found to be earlier than taller forms in Early Rose.

1278. *TROTTER, A. and 633.491:581.162
CRISTINZIO. 633.491: 575.12(45)

Prove di allevamento e di selezione della patata a mezzo di semi. I-II.
(**Experiments in improving and selection of potato by means of seeds. I-II**).

Ricerche Osserv. e Divulg. Fitopat. Camp. ed Mezzog. R. Osserv. Reg. Fitopat. Portici 1940 : 8 : 1–64.

* An abridged translation of this paper is on file at the Bureau.

Some of the local Italian varieties of potato bear abundant flowers and fruit. The number of seeds per fruit varies with the variety and as many as 400 have been found in some. When the seedlings have been transplanted into the field they soon reach dimensions equal to those of plants grown from tubers and the mature plants may be even larger and are in general indistinguishable from plants grown from tubers. The characters of the stolons and tubers in the seedlings vary from plant to plant, though some varieties such as Kipfler and Rossa di Gavoi give uniform progeny. Flowering in the seedlings is invariably more active than in the same variety reproduced from tubers. Certain Peruvian varieties of *S. andigenum* produce pollen in an abundance never witnessed in the domestic varieties in the Campania and also bear innumerable fruits.

The varieties chosen for breeding were Biancona and Riccia di Napoli, the object being to improve the yield of the former variety and the quality of the latter (particularly as regards depth of eyes) and to increase its earliness. Owing to the difficulty of getting seed however the natural progeny of a number of other varieties was also used. Some varieties, such as Basilicata, gave very variable progeny, while others, including Hindenburg and Rotondi gialla, gave progeny that was almost uniform; some seedlings formed no tubers at all, while others gave excellent yields equal to those from tuber reproduction. The yields of the first clonal reproduction were in general much higher than those of the F_1 . All inferior or diseased plants from the clonal reproductions were discarded, only one or two types from each variety being retained. Some of the selections showed a distinct improvement on the original variety in such respects as earliness, disease resistance and quality of tuber.

1279. HENDERSON, M. T. and

LECLERG, E. L.

633.491:581.162.3:578.08

Studies of some factors affecting fruit setting in *Solanum tuberosum* in the field in Louisiana.

J. Agric. Res. 1943 : 66 : 67-76.

The investigations mentioned below were undertaken to determine the degree of pollen sterility and premature flower shedding in varieties used as breeding material.

Data recorded in this paper show that a number of varieties and seedling varieties with satisfactory amounts of viable pollen are available to the plant breeder.

Isolation of potato flowers by enclosing the flower clusters in cheese-cloth or kraft-paper bags was detrimental to flower setting under Louisiana conditions during 1940 and 1941; bagging probably caused an alteration in the temperature and humidity relations around the flowers. The cheese-cloth bags were unsatisfactory in many respects; however it appears that if kraft-paper bags are used when weather conditions are generally favourable to flower setting, then the breeder can obtain adequate supplies of pure seed.

It was found that self-pollinating the Katahdin variety at the time of emasculation was relatively ineffective in inducing fruit setting. The results obtained indicate that one pollination 24 hours after emasculation was as effective as pollinations at the time of emasculation, followed by a second pollination 24 hours later.

High temperature and low moisture proved unfavourable to fruit setting, so that it would appear advisable in potato breeding for pollination to be undertaken during a period when relatively low temperature and adequate soil-moisture conditions normally prevail.

1280. HIEKE, K.

633.491:581.165.71:633.71:581.6

Pflanzenphysiologische Untersuchungen über die Alkaloide: II. Zur Alkaloidführung der Pfropfpartner bei heteroplastischen Solanaceenpfropfungen. (Physiological investigations on the plant alkaloids: II. On the occurrence of alkaloid in the graft constituents in heteroplastic Solanaceae grafts).

Planta 1942 : 33 : 185-205.

Previous work on the subject is critically analysed.

The present experiments (made in 1940 and 1941) were intended as a physiological study of alkaloid content in Solanaceae grafts to elucidate the origin of alkaloid formation in general. The material used comprised *Nicotiana* species, *Solanum Lycopersicum*, *Atropa Belladonna* and *Datura Stramonium*. The results from different combinations of scion and stock are reported

in detail but no general theoretical interpretation of the results is attempted at this stage in the investigation. The author found that:—

(1) Tomato grafted on a tobacco stock (with or without leaves) contains 90–100 mg. nicotine per 100 gr. in the fresh leaves.

(2) The graft of tobacco on tomato is nicotine free.

(3) Double grafts involving an alternate sequence of genetically nicotine determining and nicotine free partners show that the root stock determines the presence or absence of nicotine in the scion.

(4) Results (1) and (2) apply *mutatis mutandis* to grafts involving *A. Belladonna* and tomato, though the *Atropa* scion reveals traces of its characteristic alkaloid when the very sensitive pupil test is applied.

(5) On grafting two plants, both having the necessary genetic basis for alkaloid production, the root-stock was again found to determine the alkaloid in the scion, e.g. when *Datura Stramonium* was grafted on tobacco the leaves and stem of the scion contained no thorn-apple alkaloids but contained 100–110 mg. of nicotine per 100 gr. of fresh leaf.

Possible physiological explanations of these findings are suggested briefly.

1281. PARSONS, F. L.

633.491:581.6

Some cold storage studies of Kansas potatoes.

Bull. Kans. Agric. Exp. Sta. 1942 : No. 310 : Fp. 18.

Some varietal differences are noted in the deterioration of potatoes during cold storage.

1282. REDDICK, D.

633.491-2.411.4-1.521.6:575.127.2(74.7)

Development of blight-immune varieties.

Amer. Potato J. 1943 : 20 : 118–26.

A comprehensive review of the problems involved in breeding blight resistant potatoes is presented. The claim that immunity is present in any of the known South American species and varieties is rejected. Erika, Frühnußel and Robusta are three immune German varieties claimed to have been bred from a South American species but the author suggests that it is more likely that the immunity was derived from the Washington Collection, the species concerned being *Solanum demissum*. A plant of Aya papa has also been claimed as immune, but here again the plant concerned is probably a back-cross from a *S. demissum* hybrid. So far as is known, immune species are native only in Mexico. *S. polyadenium* would be a most desirable species for breeding work as it combines immunity with tuberous habit and resistance to various insect pests; it has not been possible, however, to obtain a hybrid.

S. demissum ($2n = 72$) will form a hybrid with *S. tuberosum* ($2n = 48$) provided that the former is used as the female parent. There is, however, a constant difficulty caused by the fact that many cultivated potato varieties produce practically no viable pollen. Katahdin and Earlene are exceptional in the quantity of good pollen produced. It should also be realized that *S. demissum* is a variable species which includes some quite susceptible strains. The F_1 hybrids formed are highly self-sterile and the few offspring produced do not show the usual segregation of characters but tend to resemble *S. demissum*. It has therefore been found advisable to back-cross the hybrid F_1 with the pollen of a cultivated variety, not however with the same variety that was used in making the original cross, for this procedure usually gives rise to dwarfed progeny. The F_2 generation shows some segregation of characters but immune plants tend to be extremely late types with long stolons, small tubers and deep eyes. Repeating the back-cross produces a more promising F_3 yielding up to 4 lbs. per plant but here again the tubers are spoilt by having deep eyes and an irregular contour. Satisfactory lines have been obtained from the F_4 back-cross although it has been found that these plants are only adapted to a certain range of climatic conditions. Selecting may have to be done on a regional basis.

Elimination of strains showing incomplete immunity is most important as it has been found, both experimentally and in the field, that such plants can act as intermediate hosts in which the fungus builds up a degree of virulence capable of infecting varieties normally immune. Such an abnormally high degree of virulence may then be retained over more than 20 generations. It is assumed that in nature the degree of virulence of the fungus is relatively constant. Preliminary experiments have shown that it is possible to combine scab resistance with blight immunity.

1283. TELFORD, H. S. 633.491-2.7-1.521.6

Wireworm injury and potato varieties.

Bi-m. Bull. N. Dak. Agric. Exp. Sta. 1942 : 4 : No. 5 : 7-8.

MUNRO, J. A. and

TELFORD, H. S.

Recent progress in wireworm control.

Ibid. 1942 : 5 : No. 2 : 7-11.

Field studies with a number of potato varieties showed that the most resistant variety to wireworm injury was Bliss Triumph; Early Ohio was the most susceptible and Irish Cobbler was intermediate.

1284. PEACOCK, N. D. 633.492:581.6

MEYER, A. and

STRAND, A. B.

A strain of Nancy Hall sweetpotato selected for color of flesh.

Circ. Tenn. Agric. Exp. Sta. 1942 : No. 80 : Pp. 4.

A new strain No. 103 is reported for the sweet potato variety Nancy Hall; its flesh has a more intense colour than the average plants of the variety.

FIBRES 633.5

1285. HAMILTON, R. W. and 633.51(75.7)

PRICHARD, B. E. G.

The cotton contest . . . 1936. For better yield and staple value.

Circ. Clemson Agric. Coll., U.S.D.A. 1937 : No. 156 : Pp. 31.

This report shows that the objection sometimes raised by farmers that increased staple length leads to a decrease in the total lint per acre is unjustified. It is also clear that annual purchase of pedigreed seed would increase the total yield.

1286. BROWN, H. B. 633.51:575(73)

Registration of improved cotton varieties, III.

J. Amer. Soc. Agron. 1943 : 35 : p. 241.

Bobshaw, a selection from Stoneville cotton made at Heathman, Miss. with superior fibre qualities, is described. It is a medium-early cotton but only moderately resistant to wilt.

R. M. I.

1287. 633.51:575(75.9)

New strain of Sea Island cotton shows promise.

Sth. Seedsman 1943 : 6 : No. 4 : p. 41.

Mention is made of an improved strain, Z-10, of the Old Seabrook variety of Sea Island cotton, which in tests at Florida Agricultural Experiment Station has given a good yield.

1288. 633.51:575.061.6:581.6

Items—Black cotton.

Science, Suppl. 1943 : 97 : No. 2509 : p. 9.

It is noted that the Russians have recently produced a new variety of cotton with black lint which is believed to be a faster colour than the black of dyed cotton.

R. M. I.

1289. WARE, J. O., 633.51:575.061.6:581.6:575.114

JENKINS, W. H. and

HARRELL, D. C.

Inheritance of green fuzz, fiber length, and fiber length uniformity in upland cotton.

J. Amer. Soc. Agron. 1943 : 35 : 382-92.

F_1 and F_2 generations and first generation back-crosses were obtained from Florida Green Seed x Rowden. The genetics of fuzz colour was investigated. The F_1 showed a narrow colour range intermediate between the deep green of Florida Green Seed and the pure white of Rowden. In the F_2 an almost complete series of colour variation was found, excepting the pure white, which did not reappear; the back-crosses showed less extensive colour ranges. Fibre length was also investigated. The longer values were incompletely dominant in the F_1 and a unimodal distribution of lengths appeared in the F_2 . The back-cross with Florida Green

Seed reduced the fibre length below the F_1 mean but the Rowden back-cross did not produce a corresponding increase, perhaps owing to a rather shorter fibre length in the Rowden plant used.

A slight association between green colour and shorter fibre length was discovered.

1290. YAMASHITA, K. 633.51:576.356.5:581.162.5:581.04(52)
(Cotton plants treated with colchicine).

Jap. J. Genet. 1940 : 16 : 267-70.

Polyplloid cotton plants ($2n = 104$) have been obtained from a strain of Sea Island cotton ($2n = 52$) by treatment with colchicine. Although a few well-developed pollen grains were observed in the polypliods, this was exceptional, the pollen being usually sterile and the anther dehiscence feeble.

1291. HANCOCK, N. I. 633.51:581.6(76.8)
Factors in the breeding of cotton for increased oil and nitrogen content.

Circ. Tenn. Agric. Exp. Sta. 1942 : No. 79 : Pp. 7.

Cotton varieties have been examined for the nitrogen and oil content of the seeds. The four varieties Washington, Deltapine 11A, Stoneville 2B and Coker 200 are recommended. This character does not appear to be linked with other desirable economic characters.

1292. BROWN, H. B. and 633.51:581.6:575.
HADDON, C. B.

Influence of varietal differences on the grade of cotton.

J. Amer. Soc. Agron. 1943 : 35 : 249-55.

The results of experiments are tabulated to show the effect of the variety on the grade of lint in cotton. Among the six varieties studied there was a significant difference of half a grade between the value for the highest and the lowest varieties.

R. M. I.

1293. PRESLEY, J. T. and 633.51-2.452-1.521.6(73)
KING, C. J.
A description of the fungus causing cotton rust, and a preliminary survey of its hosts.

Phytopathology 1943 : 33 : 382-89.

Varietal resistance of several species of *Gossypium* to cotton rust (*Puccinia Stakmanii* n. sp. Presley = *Aecidium Gossypii* E. and E.) has been investigated. All the American varieties used were susceptible and the only resistant types discovered were varieties *assamica* and *sanguineum* of *Gossypium arboreum*.

1294. FLOR, H. H. 633.52-2.452-1.521.6(78.4)
Flax rust.

Bi-m. Bull. N. Dak. Agric. Exp. Sta. 1941 : 3 : No. 6 : 7-9.

STOA, T. E.

Which flax varieties to grow in 1942.

Ibid. 1942 : 4 : No. 4 : 2-6.

STOA, T. E.

Varieties of flax that resist rust.

Ibid. 1942 : 5 : No. 1 : 29-31.

In addition to a description of the life history of the fungus *Melampsora Lini* which causes flax rust and data on the effect of the organism on two susceptible, one resistant and two immune flax varieties, the first paper presents the reactions of eleven "so-called rust resistant varieties" to ten physiological races of the fungus. The results show that the varieties Argentine and Ottawa 770 B are immune to all the races in the test. These varieties, it is stated, have been used as rust resistant parents in many flax hybrids now being tested; varieties with resistance similar to that of Argentine are Bolley Golden, Rio, Viking and Walsh. Buda has shown resistance in field trials and Redwing, although susceptible, is less subject to damage by the rust than Bison or Linota, because it matures earlier. Smoky Golden and seven of these last mentioned varieties are discussed in the second paper with respect to combination of high resistance with other desirable plant characteristics and a table of results is given on the relative rust resistance and comparative yields of most of the varieties described, together with

several others, present in tests undertaken in 1941. Four new hybrid selections used in these tests, are described in the third paper, as follows: Koto [(Russian x Argentine) x Bison], is resistant to wilt and most races of the rust fungus, and Renew [Newland x (19 x 112 E)], has moderate resistance to wilt and great resistance to rust, both being brown seeded flax varieties, growing to good heights and maturing about the same time as Bison, and No. 5585 [(a Czechoslovakian flax x Argentine) x Smoky Golden], and No. 5128 (Golden x Rio), are two varieties highly susceptible to wilt and rust. A more complete report on these and other varieties is to be issued later.

1295. FLODERUS, B. 633.584.3:575.127.2:582

Salix helvetica Villars and its sub-species and hybrids.

Svensk Bot. Tidskr. 1943 : 37 : 73-80.

FLODERUS, B.

Salix Starkeana Willdenow.

Ibid. 1943 : 37 : 81-82.

In the first paper botanical descriptions of the species, three sub-species and five hybrids (which include two new forms) are given.

The second paper deals with the identity of various specimens of *S. Starkeana* Willdenow.

It is suggested that the name of the specimen described as *S. livida* by Wahlenberg should be replaced by the seven years older species designation *S. Starkeana* Willdenow.

SUGAR PLANTS 633.6*

1296. ARCENEAUX, G. 633.61(73)

The variety census for 1942.

Sug. Bull., N.O. 1943 : 21 : p. 109.

The percentage distribution of sugar cane acreage according to variety is given for Louisiana. It is pointed out that varieties Co.290 and C.P.29/320, which are at present the two most extensively cultivated, should be replaced by newer varieties. Both types have a localized distribution and have shown declining yields in recent years. Possible substitutes are suggested.

1297. CROSS, W. E. 633.61:575(82)

Variedades de caña importadas: resultados obtenidos en los últimos años.

(Imported cane varieties: results obtained in recent years).

Rev. Industr. Agric. Tucumán 1942 : 32 : 193-273.

During the period in which the local Tucumán sugar cane seedlings were studied (cf. "Plant Breeding Abstracts", Vol. XII, Abst. 830) an examination was made of a great number of imported canes and the results with the best varieties are reported. These include a number of *Saccharum sinense* varieties, such as Kavangire, which is immune to mosaic and smut, various P.O.J. canes, some of which are also resistant to smut, several Coimbatore canes and some Canal Point seedlings.

1298. SUZUKI, E. 633.61:576.354.4(52)

(Cytological observations on some sugar cane varieties).

Jap. J. Genet. 1940 : 16 : 276-78.

The most frequent metaphase configurations observed in P.O.J. 2725 are $50_{II} + 7_I$ and $49_{II} + 9_I$. In both cases one of the univalents is a chromosomal fragment; tetravalents and trivalents are not infrequent.

Details are given of the arrangements in P.O.J. 2364, P.O.J. 2722, P.O.J. 2878 and P.O.J. 2883. There is a chromosomal fragment in P.O.J. 2722 which is regarded as being probably the same as that in P.O.J. 2725; both these varieties are derived from P.O.J. 2364 x EK 28.

A plant resembling *S. spontaneum* was obtained from Formosa and found to have 48 bivalents at metaphase I and a high percentage of good pollen.

1299. ARCENEAUX, G. 633.61:581.6:578.08

Varietal factors for calculating yield of sugar per ton of cane.

Sug. Bull., N.O. 1943 : 21 : 76-77.

Sugar cane varieties now being grown in Louisiana differ widely with respect to fibre content and other qualities which will affect the yield of sugar per ton of cane at a crusher or normal juice analysis.

* See also Absts 1263 and 1272.

From the results of milling tests, conducted during the past by methods previously described by the author (cf. "Plant Breeding Abstracts", Vol. IV, Abst. 450), it is possible to separate the most important released and unreleased varieties into groups of more or less similar milling properties.

A table is given with factors by the use of which the probable yield of 96° sugar per ton of each of 30 important varieties can be rapidly calculated from the Brix and percentage sucrose of normal juice; Co. 281 is used as a standard and a normal juice extraction of 76% and a boiling house efficiency of 100 is assumed for this variety and for other varieties of similar milling properties.

1300. DILLEWIJN, C. VAN. 633.61-1.421(92.2)
Die Bedeutung des Feldversuches für die Zuckerindustrie, dargestellt an der Entwicklung in Java. (The importance of the field experiment for the sugar industry, as shown in the trend of events in Java).
Zuckerrübenbau 1943 : 25 : 25-32.

The tenfold increase in the sugar yield in Java as compared with other countries between 1840-1940 is attributed to (1) the gradual transition to better and better varieties (e.g. the P.O.J. canes since 1927); (2) the constant improvement in measures of cultivation and harvesting, etc., and (3) above all the excellent system of field experimentation whereby problems regarding varieties or cultivation could be solved within a few years. The organization underlying such research in Java is described.

In conclusion it is pointed out that the more complex problems that have emerged during the last 10 years require a more elaborate technique in which Fisher's method should be introduced. Pot experiments have their value not only for purely scientific ends but also as preliminary indicators of the line of investigation to be ultimately adopted in the field experiments on the more complicated enquiries.

1301. RAMOS, R. M. 633.61-1.524(72.95)
The role of research in the Puerto Rican cane industry.
Proc. 8th Amer. Sci. Congr. Washington 1940 : 5 : 201-22.

An historical account is presented of the introduction of the various varieties of sugar cane that have been found suitable for planting in Puerto Rico.

1302. MARTIN, J. P. 633.61-1.8
Varietal differences of sugar cane in growth, yields, and tolerance to nutrient deficiencies.
Hawaii. Plant. Rec. 1941 : 45 : 79-91.

Three sugar cane varieties were grown in culture solutions and in a series of solutions each lacking one of the following elements: N, P, K, Ca, Mg, S, Mn and B.

The results obtained showed that all the varieties demonstrated the typical deficiency symptoms of each element, but some varieties showed a higher degree of tolerance to certain deficiencies than others.

The quality of the juice of all varieties was affected by the absence of certain elements, but the effect was more marked on some varieties than others.

1303. SUMMERS, E. M. and ABBOTT, E. V. 633.61-2-1.521.6:575(76.3)
Disease testing and initial seedling selection work at the Houma Station during 1942.
Sug. Bull. N.O. 1943 : 21 : 156-58.

The disease resistance of several recently introduced cane varieties is described. C.P.34/120 is adapted to all soil types in the sugar district and combines fairly early maturity and good yield with moderate resistance to the principal Louisiana diseases (with the possible exception of chlorotic streak).

1304. CROSS, W. E. 633.61-2.451.2-1.521.6(82)
Nuevas observaciones sobre el "carbón" en las distintas variedades de caña de azúcar. (Further observations on smut in the different sugar cane varieties).
Bol. Estac. Exp. Agric. Tucumán 1943 : No. 39 : Pp. 15.

Further details are given of the reaction of a number of cane varieties grown in Argentina (cf.

"Plant Breeding Abstracts", Vol. XIII, Abst. 901). Certain canes previously indicated as resistant have now been attacked but Kavangire, though attacked in certain other countries, remains free. Others that seem to be practically immune are Co. 270, Co. 290, P.O.J. 2725, P.O.J. 2878, Tuc. 1406 and Tuc. 2645.

1305.

633.63(46.9)

A beterraba sacarina. Resultados dos ensaios culturais, económicos e analíticos realizados em 1941. (Sugar beet. Results of cultural, economic and analytical tests carried out in 1941).

Sér. Estud. Inform. Téc., Minist. Econ., Serv. Edit. Repart. Estud., Inform. Prop., Lisboa 1942 : No. 17 : Pp. 98.

An historical account is given of sugar beet growing in Spain. An experiment was started in Portugal in 1941 to test the behaviour of a number of varieties that had given the best results in Spain, including certain varieties produced by the Sociedad General Azucarera de España [Spanish Sugar Society]. Data are given regarding yield of roots and of sugar, and degree of attack by *Cercospora*, mosaic, yellows and certain other diseases. The Italian variety Cesena proved resistant to *Cercospora*. The varieties Braune and Schreiber gave the highest yields of sugar.

1306.

633.63:575(73 + 71)

Sugar beet investigational work—United States and Canada.

1941 : Pp. 20 + 7. (Mimeographed).

This report gives a list of the various projects relating to sugar beet improvements in Canada and the U.S.A.

1307. OWEN, F. V. and

MURPHY, A.

633.63-2.8-1.521.6:575

Progress with curly-top-resistant varieties of sugar beets.

Fm Home Sci. Utah 1943 : 4 : No. 1 : 13-14.

Breeding of beets for resistance to curly-top is discussed and the variety Improved U.S. 22 is recommended.

STIMULANTS 633.7

1308. GOODSPED, T. H.

633.71:576.16:575

El tabaco y otras especies del género Nicotiana. (Tobacco and other species of Nicotiana).

Bol. Fac. Agron. Vet., B. Aires 1942 : No. 22 : Pp. 21.

In this lecture an account is given of the origin and characteristics of the species of the genus *Nicotiana*, and of the problems encountered in their improvement. In *N. Tabacum* one of the main obstacles is the difficulty of assessing quality and its great susceptibility to environmental modification. This is especially true of flavour and aroma; such characters as leaf structure, elasticity, burning capacity and ash quality, which also affect quality, are more susceptible of experimental determination. Many other characters of importance in breeding are enumerated; it is essential (1) to start with forms possessing the desired flavour and aroma; (2) to subject all new lines obtained to a thorough quality test, and (3) to test them under conditions as nearly as possible approximating to those of commercial plantations.

Descriptions are given of the various genetic groups of the genus *Nicotiana* and of the experimental production by the author of the species *N. Tabacum* by hybridization between *N. silvestris* and *N. tomentosa*. The author made his expeditions to South America with the express purpose of discovering the wild races of these two parental species and many of them have now been crossed together in the hope of being able to produce, among other things, forms of tobacco with greater disease resistance. It has also been possible to create an amphidiploid of *N. glutinosa* x *N. silvestris* and by back-crossing it to tobacco to produce a commercial type possessing the mosaic resistance of *N. glutinosa*.

A great number of variants in tobacco have been obtained by X-ray treatment; one of these has more leaves than the common varieties; the leaves are longer, the growth rate is less and lateral branches are produced only late in the season, all of which features make it a most valued type.

1309. SMITH, H. H. 633.71:576.356:581.04

Induced heteroploids of *Nicotiana*.

Amer. J. Bot. 1943 : 30 : 121-29.

Nicotiana Langsdorffii and *N. Sanderae* var. Sutton's Scarlet produce a considerable proportion of aneuploids, in addition to polyploids, after colchicine treatment of the seedlings. In the aneuploids, chromosomal deficiencies are more frequent than duplications, and in the case of *N. Langsdorffii*, a haploid plant was also obtained. Size and sturdiness of vegetative organs increase from haploid to tetraploid but octoploids are abnormal and less vigorous. It is suggested that these results might arise from the effect of colchicine in producing abnormal scattering of chromosomes at metaphase and subsequent irregular spindle formation.

1310. SMITH, H. H. 633.71:576.356.5:575.17:575-18

Effects of genome balance, polyploidy, and single extra chromosomes on size in *Nicotiana*.

Genetics 1943 : 28 : 227-36.

Crosses were made between diploid and tetraploid plants of *Nicotiana Langsdorffii* and *N. Sanderae* and their progeny in order to produce a complete series of diploid, triploid and tetraploid types containing every combination of the chromosome sets of *N. Langsdorffii* (L) and *N. Sanderae* (S). In the series: LLLS, LLS, LSS and LSSS, the logarithm of corolla size is directly proportional to the geometric mean of the values of the determining alleles. A comparison between diploid and tetraploid plants with the same balance of chromosome sets, e.g. LL: LLLL and LS: LLSS, shows that polyploidy has an approximately multiplicative effect on the length of the corolla tube but no effect or an adverse effect on the length of the corolla limb.

Aneuploids containing duplicated *N. Langsdorffii* chromosomes were produced and three of these caused a reduction in all parts of the corolla while two caused a decrease in one region and an increase in another. It is concluded that the independent contribution of each gene locus is equal to the geometric mean of the alleles.

1311. SMITH, H. H. 633.71:576.356.5:576.356

633.71-2.951.1:575.12

II. Symposium on theoretical and practical aspects of polyploidy in crop plants. Discussion.

Biol. Symp. 1941 : 4 : 111-13.

The following three lines of investigation are being carried out by the Division of Tobacco Investigations at the Bureau of Plant Industry.

N. Debneyi has been crossed with *N. Tabacum* in order to transfer the factor for resistance to blue mould from the former species to the latter. Most of the F_1 however did not survive the seedling stage and the few remaining plants were found to produce a high percentage of dyad pollen due to asynapsis. The F_1 was similar to the amphidiploid line obtained by direct colchicine treatment. The effect of polyploidy on vegetative vigour depends a great deal on the species. Tetraploid plants of the tetrabasic species *N. Debneyi* are more vigorous than the diploids and tetraploid plants of the dibasic *N. glauca* are less vigorous. These results contrast with Clausen's report that diploids of the dibasic species *N. Tabacum* and *N. rustica* are more vigorous than either the haploids or tetraploids.

A promising amphidiploid line has been obtained from *N. Tabacum* \times *N. glauca*; it contains a high percentage of anabasine and has an improved growth habit.

The distribution and effects of quantitative genes are being investigated in the hybrid *N. Langsdorffii* \times *N. Sanderae*.

1312. CLAUSEN, R. E. 633.71:576.356.5:581.04:575.127.2

II. Symposium on theoretical and practical aspects of polyploidy in crop plants. Polyploidy in *Nicotiana*.

Biol. Symp. 1941 : 4 : 95-110.

The species of the genus *Nicotiana* are divisible into two groups: the American and the Australian. The former consists of species whose basic chromosome number is 12 and both monobasic and dibasic types occur; a few species have the basic numbers 9 and 10. The second group is confined to Australia and neighbouring islands; the following chromosome numbers are found: 16, 18, 20, 22, 24, and 32.

Polyploids and amphidiploids have been obtained from many species by colchicine treatment

and by applying heteroauxin to decapitated stem apices. The importance of this technique for plant-breeding is more indirect than direct. It is a useful method for transferring desirable characters to economic plants but the amphidiploids obtained from F_1 hybrids in this genus tend to show reduction in vegetative vigour in dibasic species and higher polyploids of monobasic species; in addition, many of the amphidiploids, viz: *N. silvestris* x *N. Setchellii*, *N. silvestris* x *N. tomentosiformis*, *N. silvestris* x *N. tomentosa* and *N. glutinosa* x *N. tomentosa* are almost completely female-sterile. In the third of these crosses, it has been found that female-sterility depends to some extent on the strains used and in one case 1% of the progeny were fertile. Pollen in these forms develops normally but the embryo sacs abort in the binucleate or tetranucleate stages. No clear cut segregation of sterility could be observed in the progeny of $4n$ (*N. silvestris* x *N. tomentosiformis*) x *N. Tabacum*.

It is believed that *N. Tabacum* is an amphidiploid species derived from *N. silvestris* x *N. tomentosiformis* or closely allied forms. A comparison between *N. Tabacum* and the artificially produced amphidiploid shows a general resemblance in morphological characters which however is not exact. The pronounced female-sterility of the amphidiploid is a conspicuous difference although the general meiotic behaviour of the two forms is closely comparable. Haploid plants of *N. Tabacum* have an average of less than one bivalent per cell in meiosis while the diploid hybrid has an average of 2.5 bivalents. Tetraploid plants of *N. Tabacum* are normal in appearance while the amphitetraploids are very deformed and completely infertile. The author suggests that these differences might well have arisen by changes in *N. Tabacum* subsequent to its formation. The gene for mammoth growth *mm* behaves as a simple recessive in crosses with *N. silvestris* and *N. tomentosiformis*, in both of which the dominant gene *Mm* is represented once. Since the gene is located in the F chromosome of *N. Tabacum* which is a member of the *tomentosa* chromosome set, it appears that the corresponding gene originally present in the *silvestris* set has been eliminated. A similar loss has occurred for the asynaptic gene which occurs only in the A chromosome and not in the *silvestris* set where it presumably occurred originally. The recessive gene for "white-seedling" found in the T chromosome has been eliminated from the *tomentosa* set.

This mode of evolution by elimination of duplicate factors also affects recessive lethals and has an important bearing on breeding experiments as the elimination of vital genes reduces the viability of hybrids with other species. The location of vital genes in the F and C chromosomes has been demonstrated by the use of monosomics; only a very minute portion of the F chromosome is required for the production of viable offspring.

It is concluded that the evolution of *N. Tabacum* since its formation (probably by gene mutation) reduces considerably the chance of synthesizing exactly the present species from monobasic types.

1313. ALCARÁZ MIRA, E. and
BORBOLLA Y ALCALÁ, R. DE LA 633.71:581.6
Contribución al estudio químico de los tabacos españoles. 1^o. part: Tabacos exóticos. (**Contribution to the study of Spanish tobaccos. I. Exotic tobaccos**).
Bol. Inst. Invest. Agron., Madr. 1943 : No. 8 : 61-80.

Estimations were made of the total nitrogen, protein nitrogen, nicotine and ash content. There was a tendency for the protein nitrogen to be less in the higher quality types than in the lower grades.

1314. ESTEVA, C. (jun.) 633.71-2-1.521.6(72.95)
Annual Report of the Tobacco Institute of Puerto Rico for the fiscal years 1939-40, 1940-41 (1942) : Pp. 98.

The most important work on breeding described in this report has been carried out by the recently organized Department of Pathology and Genetics, where investigations are in progress on the inheritance of resistance to mosaic (*Marmor Tabaci* var. *vulgaris*), black shank (*Phytophthora parasitica* *Dastur* var. *Nicotianae*) and the "mottle" virus.

1315. FOSTER, H. H. 633.71-2.411.4-1.521.6:575.127.2
Resistance in the genus Nicotiana to Phytophthora parasitica Dastur var. nicotianae Tucker.
Phytopathology 1943 : 33 : 403-04.

N. repanda is recommended to breeders on account of its moderate resistance to black shank

(*Phytophthora parasitica* var. *Nicotianae*). F_1 plants were obtained from the cross *N. repanda* (4n) x *N. Tabacum* (2n) but these died after transplanting.

1316. MCLEAN, R. A. 633.71-2.484-1.521.6
Observations on *Cercospora* leaf spot of tobacco and the question of varietal resistance.

Phytopathology 1943 : 33 : 354-62.

It is suggested that apparent varietal differences in susceptibility to leaf-spot (*Cercospora Nicotianae*) are probably due to differences in the rate of leaf development.

1317. MATTHEWS, E. M. and HENDERSON, R. G. 633.71-2.484-1.521.6(75.5)
Yellow Special tobacco, a new flue-cured variety resistant to black root-rot.

Bull. Va Polyt. Inst. Agric. Exp. Sta. 1943 : No. 346 : Pp. 7.

The bulletin contains a description of the performance of a flue-cured tobacco variety, known as Yellow Special, which has been tested for a number of years and is now recommended for general use in Virginia. The exact origin of the variety is unknown, but it is supposed to have been selected from a cross between Harrison Special and a small leafed variety, possibly Lizard Tail, and combines certain desirable qualities of both parents; it is extremely resistant to black-rot, being able to grow rapidly and normally in soil infested with the fungus (*Thielaviopsis basicola*) which causes this disease, giving a high yield of smooth leaves, well spaced on the stalk, which, when ripe, are easily cured to a golden yellow colour. The quality of the tobacco has proved excellent.

The variety also possesses some resistance to certain other diseases and work is now in progress to test its resistance to black shank and to make improved selections.

1318. MOSS, E. G. and BULLOCK, J. F. 633.71-2.484-1.521.6:575.12(75.6)
Two new varieties of flue-cured tobacco, 400 and 401.

Bull. N.C. Agric. Exp. Sta. 1942 : No. 337 : Pp. 8.

Variety No. 400 has been selected for resistance to black root rot (*Thielaviopsis*) and is suitable for use in the Old and Middle belts of North Carolina and Virginia. A heavier bodied variety, No. 401, obtained from crossing No. 400 with the variety Cash, is also resistant but with thicker leaves and is suitable for the New and South Carolina belts.

1319. KOTTE, W. 633.71-2.7:576.16:631.521.6
Die durch *Tylenchus dipsaci* Kühn verursachte "Umfällerkrankheit" des Tabaks. (The "Umfällerkrankheit" of tobacco caused by *Tylenchus dipsaci* Kühn).

Z. PflKrankh. 1943 : 53 : 37-42.

Among the pests discussed is *Tylenchus dipsaci* and the need for further research on specialization in this parasite and its host range is stressed. Since the pathological condition which it causes has long been known, but occurs only sporadically, though tobacco is frequently grown in proximity to other host crops of *Tylenchus*, it may be assumed that the race of *Tylenchus* injurious to tobacco is highly specialized.

1320. MCKINNEY, H. H. 633.71-2.8-1.521.6
Studies on genotypes of tobacco resistant to the common-mosaic virus.

Phytopathology 1943 : 33 : 300-13.

Resistance to mosaic caused by Nicotiana virus 1 has been studied with three varieties. T.I.448A is a so-called symptomless carrier and is immune to mosaic although it shows some minor effect. The nature of virus resistance is discussed.

1321. WAHNON, J. S. 633.74-1.524(46.9)
Subsídios para o estudo dos cacauz de S. Tomé e Príncipe. (Notes for the study of the cacaos of S. Tomé and Príncipe).
Sér. Invest., Minist. Econ., Serv. Edit. Repart. Estud., Inform. Prop., Lisboa 1941 : No. 9 : Pp. 84.

The cacao cultivated in the islands of S. Tomé and Príncipe is of the Forastero type and the

product is classed as medium quality. A full account is given of the morphology of the cacao seed and of the preparation of the commercial product.

1322. MAGIE, R. O. 633.79-2.411.4-1.521.6(74.7)
The epidemiology and control of downy mildew on hops.

Tech. Bull. N.Y. St. Agric. Exp. Sta. 1942 : No. 267 : Pp. 48.

The results of field tests on the resistance of hop varieties to *Pseudoperonospora Humili* are presented. There is some indication of a positive correlation between leaf and cone susceptibilities.

AROMATIC PLANTS 633.8

1323. GUENTHER, E. S. 633.8
Botany, origin and application of essential oils.

Amer. Perfum. 1943 : Pp. 15.

A list is presented of the names and distributions of essential oil plants.

CONDIMENTS 633.84

1324. CHRISTENSEN, H. M. and 633.842:576.356.52
 BAMFORD, R.
Haploids in twin seedlings of pepper, *Capsicum annuum L.*

J. Hered. 1943 : 34 : 99-104.

An investigation of a collection of twin seedlings showed that 3.6% were haploid. Morphological differences between haploid and diploid plants are slight, being most pronounced in the size of the stomata and fruit. Haploid plants are almost completely self-sterile but set a few seeds, presumably from pollination by diploids. Meiosis is described; there are twelve haploid chromosomes which behave in a considerable variety of ways, all transitions between complete lack of pairing and six "bivalents" being found. The latter configuration separates fairly regularly but other arrangements segregate more or less at random. Irregularities during meiosis I are repeated at meiosis II.

1325. GIRAL, F. and 633.842:577.16
 SENOSAIN, J. /
 Contenido en ácido ascórbico de algunas variedades de chiles mexicanos.
(Ascorbic acid content of certain Mexican varieties of chilli).

Ciencia, Mexico, D.F. 1940 : 1 : 258-59.

Large differences were observed between different varieties, the sweet forms having much more vitamin C than the hot forms, sometimes up to 10 times as much. There was also an inverse proportion between nitrogen content and ascorbic acid content.

1326. COCHRAN, H. L. 633.842:581.6
Perfecting "Perfection".
 Sth. Seedsman 1943 : 6 : No. 6 : 15, 26.

Truhart Perfection, a selection from Perfection pimiento pepper is described; it combines regular fruit shape with good quality.

1327. SCHERMERHORN, L. G. 633.842:581.6(74.9)
Rutgers World Beater No. 13 pepper.
 N.J. St. Hort. Soc. News 1941 : 22 : p. 1348.

Rutgers World Beater No. 13 is a selected strain of the pepper variety World Beater. It is resistant to mosaic and has a better quality than the original variety.

1328. ROQUE, A. and 633.842-2.8-1.521.6
 ADSUAR, J.
Studies on the mosaic of peppers (*Capsicum frutescens*) in Puerto Rico.

J. Agric. Univ. P.R. 1941 : 25 : 40-50.

The behaviour of the pepper (*Capsicum frutescens*) mosaic virus is described. Only two varieties of pepper out of the eighty-four tested were resistant.

OIL PLANTS 633.85

1329. WALSTER, H. L. 633.854.54.00.14(78.4)
Advancing the flax front.
 Bi-m. Bull. N. Dak. Agric. Exp. Sta. 1943 : 5 : No. 5 : 2-11.
 Varietal tests are reported for yield, quality and disease resistance of linseed.

1330. 633.854.56(72)
Mexico finds a substitute for tung oil.
 Agric. Amer. 1943 : 3 : p. 38.
 The suggested substitute is cacahuananche, a tree which grows wild in certain states of Mexico and whose nuts are used by the Indians for lighting purposes.

MEDICINAL PLANTS 633.88

1331. VASIL'ČENKO, I. T. 633.88:576.16:581.4
(The phylogenetic significance of seedling morphology in the Umbelliferae).
 Sovetskaja Botanika (Soviet Botany) 1941 : No. 3 : 30-40.
 The form of the cotyledons in the umbellifers is characteristic for the genera; this, and the form of the first leaf and of the tubers when present, are all regarded as having phylogenetic significance.

1332. 633.885.1:581.6:578.08
Quinine content of newly discovered cinchona stands.
 Science Suppl. 1943 : 97 : No. 2518 : p. 12.
 A method for estimating quinine content in the field by means of a portable device for comparing the fluorescence is briefly noted. R. M. I.

RUBBER PLANTS 633.91

1333. SCHACHAMEYER, C. 633.912-1.557
Contribution à l'étude de la variabilité de deux caractères principaux de l'hévéa cultivé. (Contribution to the study of the variability of two of the main characters of cultivated Hevea).
 Bull. Agric. Congo Belge 1942 : Nos. 3-4 : Pp. 24.
 The characters studied are yield and size of the trunk and tables are given of data obtained on (a) intra-clonal variability of yield of latex, (b) monthly variability of yield, (c) weekly variability of latex concentration, (d) intra- and inter-clonal variability of the circumference, (e) the relation between the value of the mean absolute deviation of the measurements of the circumference and the age of exploitability of the stand and the inter-clonal variability of tapering of the trunk (*défillement*). R. M. I.

1334. KULI'TIASOV, M. V. 633.913:576.16
(The questions of the origin of *S. tau-saghyz* in the light of new facts).
 Sovetskaja Botanika (Soviet Botany) 1941 : No. 3 : 21-29.
 This is an ecological survey in which the author discusses the geography and evolution of the new species, *Scorzonera Kirghisorum* C. Afan., discovered in 1937 by Afanasi'ev on mountain sides in the Eastern Turkestan range at an altitude of 1900-2100 m. A new expedition in 1938 brought to light certain new facts. As the latex is yellow in colour and the species is attacked by somewhat similar insect pests, it is thought to be closely related genetically to other species found in the Kara Tau and Kuiuk Mountains: *S. karatavensis*, and *S. longipes*, but not to *S. tau-saghyz*. The bulk of the paper is devoted to the taxonomical and palaeontological evidence relevant to the main argument; it apparently bears out the assumption that a close relationship between the geographically isolated forms is due to the penetration of their ancestors into this region in the pliocene epoch, and their dispersal and separation in the subsequent geological periods. H. F.

1335. ARTSCHWAGER, E. 633.913:581.4
Contribution to the morphology and anatomy of guayule (*Parthenium argentatum*).
 Tech. Bull. U.S. Dep. Agric. 1943 : No. 842 : Pp. 34.

In this well-illustrated paper, the author points out the advantages to be derived in establishing the relation of rubber content to anatomical structure. Little has been done yet in the

way of direct correlation but it is suggested that only plants with a well-developed primary phloem (rubber being densest in the phloem rays) should be used in selection programmes.

1336. ŠČEPOTI'EV, F. L. 633.917:581.162
 (The biology of flowering of *Euonymus nana* M.B.) 633.917:575.127.5
 Sovetskaja Botanika (Soviet Botany) 1941 : No. 3 : 130-35.

The dwarf species, although possessing at present a comparatively low gutta percha content 3, 2 and 1% in the bark of stems, leaves and roots respectively, would, in the author's opinion, yield more gutta percha if systematic selection of more productive plants were to be made. At the same time, it readily produces hybrids with both the most important commercial species, *E. verrucosa* and *E. europaea*, although no inter-specific hybrids between the latter species have hitherto been obtained. Hence follows the importance of further study of the biology of this plant. This paper deals with the structure of its flowers, the character and nature of flowering, the mode of pollination and seed setting, and the ripening of the fruit, which occurs in August.

H. F.

FRUITS 634

1337. JOHANSSON, E. 634:575(48.5)
 Om uppdragning av nya fruktsorter. (On the production of new varieties of fruit).

Sverig. Pomol. Fören. Årsskr. 1942 : 43 : 121-30.

The author takes Alfons Fischer's four geographical centres of origin for species of fruits and berries and also some records by Vavilov as the basis of a review of wild or indigenous types from which existing cultivated forms have arisen or that may be of value in breeding for the improvement of Swedish fruits. Apples, the various plum species and pears are the main fruits discussed.

Evidence is cited from English and Russian sources supporting the view that *Prunus domestica* (the European plum) probably arose from a *P. cerasifera* x *P. spinosa* cross, followed by subsequent doubling of the chromosome number. At Alnarp crosses were made between the cultivated plum and the sloe. The resultant hybrids had $24 + 16 = 40$ chromosomes and yielded fruits intermediate in size and taste between the plum and the sloe. Their value as stocks for plum trees has not yet been tested.

Hybridization (including crosses with wild forms), induced mutation and modification of the chromosome number are discussed as methods of producing new types, many examples being drawn from Swedish, English, American and German varieties of apples, pears and other fruits, whose origins are mentioned. Out of the large numbers of hybrid fruit trees grown at Alnarp, so far the triploid apples and pears have produced no promising seedlings with the exception of a few tetraploids.

At Alnarp too, crosses between Signe Tillisch and Kunglig Kortstjälk [Royal Short Stem] have resulted in a high percentage of progeny that are late in coming into leaf and in flowering. Another cross between Kunglig Kortstjälk and Riesenboiken has produced a late flowering type of promising quality. Hybridizations with the Vintertaffet apple have in general given highly useful types for cultivation.

In the course of experiments at Alnarp extending over the last 20 years very large numbers of hybrid seedlings of various fruits, including about 10,000 apple trees, have been raised. Some apple seedlings from the cross Cox's Orange with Golden Noble seem likely to yield an apple like Cox's Orange with a high content of vitamin C, while other types from a cross of Antonovka with Ecklinville will probably combine qualities such as good and uniform yield, winter hardiness and suitability for domestic purposes. A few types from the cross Flädie x Oranie have a very attractive appearance combined with good quality. Some selections from Cox's Pomona crossed with Boiken have fruits of good quality that keep very well.

Only a few promising pears have been obtained by selection; one from the cross Clapp's Favourite with the Seigneur d'Esperen pear seems very fruitful and equal to Seigneur d'Esperen in quality.

One promising plum has been selected from a cross of Reine Claude d'Oullins and Rivers Early Favourite.

Some promising cherry hybrids are also being grown.

Group sterility in fruit trees and the disadvantage of certain triploid apple and pear varieties as parents in hybridization are mentioned.

In discussing mutant varieties an instance is cited of a Reine Claude d'Oullins tree at Alnarp with one branch bearing violet coloured fruits.

A collection of scions from mutant types of fruit trees has been started at the State Horticultural Research Division.

Tetraploid fruits and the ways in which they may arise are briefly discussed. None of the apple tetraploids in Sweden have blossomed yet.

1338. NILSSON, F. 634:575(48.5)
Försöksverksamhetens betydelse för fruktodlingen. (**The importance of research for fruit culture**).
Sverig. Pomol. Fören. Årsskr. 1942 : 43 : 155-61.

The importance of testing results of research in other countries before applying them to Swedish conditions and of conducting experiments as far as possible under conditions similar to those obtaining in practical horticulture is stressed.

Cytological research has brought about great advances in the study of problems of the floral biology of fruit trees, though in Sweden relatively little had been done until recently in this direction.

The study of varieties is of great importance for the improvement of fruit culture in Sweden, where a lot of so-called land varieties and imported forms have been grown. Variety trials and improvement by breeding have now been recognized as essential for the production of new types for the needs of commercial growers in different parts of the country. The demand for hardy forms must be met and problems of cultivation (e.g. stocks, pruning, etc.), frost damage, quality (including vitamin content) and storage are not being neglected.

Purely scientific studies of the morphology, physiology and cytology of fruit trees are also in progress and may contribute results of practical value.

1339. NILSSON, F. 634:575(48.5)
635:575(48.5)
Specialkursen för trädgårdskonsulenter m. fl. på Alnarp.—Den lokala försöksverksamheten. (**Special course for horticultural advisors etc. at Alnarp—Local experimental research**).
Sverig. Pomol. Fören. Årsskr. 1942 : 43 : 224-31.

The system of decentralization of horticultural research in Sweden is outlined with information on local centres for experiments and observations on vegetables and various fruits and berries. Local improvement work on vegetables is mainly in the hands of private seed firms whose work, however, needs to be supplemented in certain cases. Local investigations on fruit trees need to be amplified so that types suitable for various districts may be developed.

A regional survey of fruit varieties and any new mutant forms should also be included in the research programme.

1340. SONESSON, N. 634:575(48.5)
Balsgård's Fruktträdssödrlingsanstalt. (**Balsgård Institute for the Breeding of Fruit Trees**).
Sverig. Pomol. Fören. Årsskr. 1942 : 43 : 5-24.

Full information is given about the origin of the institute and its aims, as well as the foundation in 1941 of the Association for the Breeding of Fruit Trees and its objects.

Two major problems confronting the new institute in 1934 were: (1) the production (for southern Sweden in particular) of triploid and other varieties of apples with good keeping quality to supply the market when Swedish apples were out of season; (2) the production of winter-hardy types of apples (and also plums, pears and cherries) of good quality suitable for central and southern Swedish conditions.

Over-specialization in the work of the institute must, however, be avoided and many other fruits and berries are being investigated; good results can already be expected in hazel-nut improvement.

The purchase, financial basis, equipment, etc., of the Balsgård property to meet the needs arising from the extensive research programme of the Association are described.

1341. TATARINTSEV, A. S. 634:575.127(47)
 (Research work at the plant breeding faculty of the Michurin
 Horticultural Institute).

Plodovo-Jagodnye Kul'tury (Fruit Crops) 1940 : No. 3 : 78-81.

Investigations are in progress on the growth of the pollen tubes and the development of the embryo in interspecific crosses such as apple x pear, *Crataegus* x pear, *Crataegus* x apple, raspberry x strawberry and the reciprocals. The pollen tubes of apple were capable of penetrating quite deeply into the style of the pear, though somewhat more slowly than the controls; some succeeded in penetrating to the embryo sac and effecting fertilization. The reciprocal combination was less successful; among 984 seeds produced in the apple x pear cross only 1 had an embryo; in the reciprocal none had an embryo.

Crataegus pollinated by apple or pear showed pollen tube growth only in the upper part of the style, an effect also observed in the raspberry x strawberry crosses.

Crosses are also being attempted between apple and *Sorbus* and between different species of *Grossularia*.

Hybrid apple seedlings have been grafted on to a variety of mentors to observe the effect of different forms of apple, pear, quince, *Sorbus*, *Crataegus* and medlar.

Investigations are also being made on such subjects as the interaction between the organism and the environment, vegetative *rapprochement*, crossing by means of pollen mixtures and the addition of the stigma of the pollinating species; the last 2 methods have increased the percentage set in crosses of sweet x sour cherry and plum x cherry.

1342. PUŠKARSKIJ, S. D. 634:581.331.2:575.12:578.08
 (Collection of pollen for hybridization).

Plodovo-Jagodnye Kul'tury (Fruit Crops) 1940 : No. 3 : 95-96.

The author gives a short account of a series of experiments, conducted during 1937 and 1938, to ascertain the best practical method of collection of pollen, and to study the effect of drying and/or desiccation on the rapidity of maturation and the rate of dehiscence of pollen sacs and on pollen viability. Unopened flower-buds of pear, apple and an unknown species of *Prunus* were divided in 4 groups: (1) a single layer of pollen sacs was placed in a Petri dish kept on a shaded window sill at 18-20° C.; (2) similarly treated, but placed immediately in a desiccator with CaCl_2 ; (3) kept in the shade for 12 hours in a Petri dish, after which the pollen sacs were removed and left in the same receptacle; and (4) treated as (3) but removed after a period of 24 hours. Flowers of the same species but of different varieties, emasculated 24 hours previously, were pollinated with the material obtained under treatments (1) to (4). 94.8% of the flowers fertilized with pollen from (4) set as against 60% with pollen collected from (1). In 1938 the experimental series was repeated but the flower-buds were gathered when they were just opening; the greatest number of settings was obtained with treatment (2) and the least with (1).

1343. IL'INSKIJ, A. A. 634-1.524(47)
 (The wild fruit trees of the Southern Daghestan).

Plodovo-Jagodnye Kul'tury (Fruit Crops) 1940 : No. 3 : 40-48.

In this report from the Daghestan horticultural and small bush fruit experimental station an account is given of economically important fruit trees growing in the wild state in the forests of North Eastern Caucasus. Morphology and productivity of *Juglans regia* L., *Corylus avellana* L., *Malus* sp., *Pirus communis* L., *Cydonia oblonga*, *Mespilus germanica* L., *Prunus divaricata* Ledb. and *Cornus Mas* L. are discussed in some detail.

H. F.

1344. LUNDIN, Y. 634-2.111-1.521.6(48.5)
 Frukträdens härdighet vintern 1941-1942. (Hardiness of fruit trees
 in the winter of 1941-42).

Fruktodlaren 1942 : No. 6 : 168-71.

A report on the results of a questionnaire sent to fruit growers in Sweden on the frost resistance of different varieties of apples, pears, plums and cherries during the winter of 1941-42.

1345. HILLS, J. L. 634.1:576.356.5:581.04
 Fifty-fourth Annual Report 1940-1941.

Bull. Vt Agric. Exp. Sta. 1941 : No. 475 : Pp. 40.

In the genetical section of this report, it is stated that a remedy for sterility in apple and pear progeny is being sought along lines of chromosome alteration and induction of polyploidy.

Colchicine has been applied to five-year-old Bartlett pears and to 30-year-old Northern Spy apples. Seedlings of some back-crossed forms and others from self-pollinated cultigens, have come to the blossom stage.

1346. SOLOV'eva, M. A. 634.1-2.111-1.521.6:578.08
(Determination of the frost resistance of fruit trees).

Sovetskaja Botanika (Soviet Botany) 1941 : No. 1-2 : 133-44.

Two types of freezing chamber are described, one for testing cut branches in the laboratory and another, of slightly reduced dimensions, for direct utilization in the field. One-year-old branches of different varieties of apple and pear showed clear differences in the amount of injury when tested at temperatures of -15° , -19° and -20.5° C. for six hours. The results obtained with the laboratory method agreed with those obtained in the field. The apple variety Antonovka was the least injured in all the experiments.

1347. KLANG, C. A. 634.11:575(48.9)
Ingrid Marie, en värdefull äpplehyhet. (**Ingrid Marie, a useful new apple**).
Fruktodlaren 1943 : No. 2 : 41-43.

The new dessert apple, which comes from Høed on the island of Fünen and is also called Høed Orange, was obtained from a seedling growing near a Cox's Orange tree. There are thus grounds for assuming it to be the offspring of a Cox's Orange, which, moreover, it closely resembles in its characteristics.

It can be used in cooking.

1348. BLAKE, M. A. 634.11:575.12-181.13(74.9)
Dwarf apple trees appear in progeny of apple crosses.

N.J. St. Hort. Soc. News 1941 : 22 : p. 1321.

Twenty-eight dwarf and semi-dwarf trees were obtained out of a total of eighty-seven offspring from the cross Gallia Beauty x Macoun.

1349. SHAW, J. K. and 634.11:575.247
SOUTHWICK, L.
Somatic mutations in the apple.
Science 1943 : 97 : p. 202.

Two types of somatic mutation of the McIntosh apple propagated at the Massachusetts Experiment station are cited. The fruit of both is uniformly red and the two types can only be distinguished by the difference in their behaviour when budded on to the clonal stock, Spy 227. In 1941 growth of both types started normally but while Type G continued to grow normally, by midsummer all the buddings of Type R were dead or dying. Buddings of Stayman and Winesap on the stock also died. Further investigations are in progress. R. M. I.

1350. MURNEEK, A. E. 634.11:575.247(77.8)
Factors affecting size and color of fruit (with reference to apples and peaches).

Bull. Mo. Agric. Exp. Sta. 1941 : No. 428 : Pp. 19.

The selection of "red bud sports" for improving the market value of apples is suggested.

1351. NILSSON-EHLE, H. 634.11:576.356.5(48.5)
Fortsatta arbeten på framställande av tetraploida äpplen. (**Further work on the production of tetraploid apples**).
Sverig. Pomol. Fören. Årsskr. 1942 : 43 : 25-28.

Previous work on tetraploid apples is reviewed and their value as a potential source of triploids showing transgressive segregation for good keeping qualities combined with desirable features found in existing triploid varieties of recognized merit is considered. It is suggested that tetraploid forms of all the best triploid apples in Sweden should be produced and the author records some results of his experiments to produce tetraploid Ribston, Gravenstein, Canada Reinette, Rhode Island Greening and the Vrams, an apple of unknown origin with very good keeping quality.

The winter-hardiness found in some diploid varieties might also be introduced into the new triploid forms.

Tetraploid production by seed from triploids will still retain its particular value, in spite of the recently evolved colchicine technique.

The possible value of tetraploid varieties (which will probably be found to be the latest ripening) for Sweden and other more southerly fruit growing regions is referred to.

Large numbers of tetraploid apple forms have been raised as experimental material since 1938 and will be under observation at the Plant Breeding Institute in Fjälkestad from now on.

1352. HÜLPHERS, A. 634.11:578.088
Husmodersäpple kontra Holländare. (**Husmoder apple versus Holländare**).

Fruktodlaren 1943 : No. 1 : 22-23.

Specimens of the above apples are compared and are shown to represent two distinct varieties, in spite of the prevalent confusion among some growers, who have held that the two names were synonyms.

1353. JOHANSSON, E. 634.13:581.162:575.061.1
Ett remonterande päronträd. (**An ever-bearing pear tree**).
Fruktodlaren 1942 : No. 5 : 139-41.

A pear tree is described which blossomed and set fruit twice in the same year. This behaviour appears to be to some extent a varietal character.

1354. MARKOV, N. V. 634.21-1.524(47)
Wild apricots in the Alma Ata region.
Plodovo-Jagodnye Kul'tury (Fruit Crops) 1940 : No. 3 : 49-51.

Among the wild fruit trees of Alma Ata the wild apricot comes next in frequency after the apple and the bird cherry, and represents 12% of the population. In certain areas such as the Kotur-Bulak ravine, it represents up to 25% ; here 200 different forms have been found and described, differing in fruit size, form and flavour, time of ripening and habitat. The main stands are at 1200 to 1400 m. above sea level. At the lower altitudes the apricot is found on the northern slopes and the trees are sometimes up to 10-12 m. high. The average yield per tree varies in different years from 5 to 20 kg. but some yield up to 100 kg. and over. Time of flowering varies from 15th April to 10th May, fruit ripening from early July to late August and even September. The average fruit weight is from 8 grm. to 15 grm. but occasional fruits weigh up to 26 and some even 35-40 grm. The majority of the fruits have less flesh than the cultivated apricots but in certain forms the proportion of flesh to stone is higher than in the cultivated apricot. In flavour most of the fruits are quite good and some are not inferior to the cultivated types. About 70% of the forms have free stones, about 20% separate imperfectly and 10% have clinging stones. Two forms have been found with sweet kernels. Most of the trees are badly attacked by weevils, but odd ones appear to be resistant or to escape. The 28 best forms, superior as regards fruit size and flavour, healthiness of trees and a number of other features of importance in breeding, have been selected. Some of them exceed the cultivated apricots in sugar content and are equal to them in flavour and consistency of flesh.

1355. KUZNETZOV, P. V. 634.22:575.127.2
(**The role of *Pirus salicifolia* Pall. in the development of fruit growing in arid regions**).

Sovetskaja Botanika (Soviet Botany) 1941 : No. 1-2 : 103-07.

Details are given regarding the habitat and biology of the species ; it is highly drought resistant and tolerant of extreme temperature changes, and of chalky or saline soils ; it is also resistant to scab, woolly aphis and many other diseases and pests. Forms varying in time of ripening from August to October have been found. Variation has been observed in other features too and descriptions are given of some of the forms.

Pears grafted on to *P. salicifolia* thrive better in arid soils than those on *P. communis* rootstock. Natural hybrids between *P. salicifolia* and the common pear have been found and a great number of others have been made artificially. The success of the crosses varies very much in different varietal combinations. The hybrids are mostly intermediate between the two species, but many of them have leaves resembling those of *P. heterophylla*.

1356. BÖRNER, C. 634.23-2.7-1.521.6
Die Frage der züchterischen Bekämpfung der schwarzen Blattläuse der Kirschen. (**The question of control of the Cherry Black Flies by breeding**).
Z. PflKrankh. 1943 : 53 : 129-41.

An outline is given of the biology of the insect and its effects upon its hosts which in Germany comprise the sweet and sour cherry and also *Prunus chamaecerasus*.

Observations lasting some years, stimulated by the belief prevalent among growers that the pests prefer certain trees and varieties, led the writer to investigate whether immune varieties existed, with a view to breeding such types and to devising ultimate control by varietal selection. Since his results were negative, he suggests that local conditions probably account for the higher incidence of the pest on certain cherry trees, especially if they particularly favour the development of sexual forms in autumn, thus bringing about a regular infestation with winter eggs.

Experiments on the transmission of the pest were made with three trees for each of 75 sweet cherry varieties and five sour varieties. The only varieties not accepted by the fly were Winklers Frühe and Kronprinz von Hannover. Infestation was only slight on these, but whether they may be regarded as resistant in the open remains to be ascertained.

Further observations confirmed the writer's former view that the sour cherry black fly is *Myzus cerasi* and the sweet cherry black fly, var. *pruniavium* (C.B. 1926). Studies with other material also indicated that the two types could be distinguished by their appearance and details of the differences are given; it is incidentally pointed out that giant sour cherry types [as represented by Waageningen nymphs (1923)] appear to resemble the dwarfs of the sweet cherry [Naumberg nymphs (1941)] in many respects though fundamental differences also exist. The relation between these findings and the sex phenomena of the flies requires further study. The frequently recorded proximity of the two types and their simultaneous geographical distribution can be interpreted in favour of the establishment of the two sub-groups suggested. Since the biological and morphological distinctions between the old world cherry black flies are remarkably like those found in the races of *Phylloxera*, it is possible that the differences in the two species may depend upon hereditary differences in sensitivity to alternative defence factors of the sweet and the sour cherry, thus rendering it impossible for the particular form of fly that is parasitic on one species to feed upon the other species. Analysis of larger colonies from sweet and sour cherries should show whether both types of fly breed true for this characteristic; genetic studies of the two pests are possible since they can be crossed. Also, in spite of difficulties due to the difference between the chromosome number of the two cherry species it may be possible by hybridization to breed seedlings immune to both types of fly. This objective could be kept in view in connexion with the work on sweet x sour cherry crosses at present in progress at the Institutes at Halle and Müncheberg in order to overcome the self-sterility of the sweet cherry and eliminate the susceptibility to *Monilia* of the sour cherry (and the English Morello in particular).

1357. BLAKE, M. A. 634.25;575.242(79.4)
Rare variation of peach.
 N.J. St. Hort. Soc. News 1941 : 22 : p. 1319.
 An open-pollinated seedling of Goldeneast produced flowers whose petals were abnormally large and also leaves that were exceptionally large and thick. In addition to the type of petal mentioned, a few flowers bore the showy type of petal characteristic of Goldeneast while one flower produced three petals of the first type and two of the second.

1358. PALMITER, D. H. and 634.25-2.8-1.521.6(74.7)
 HILDEBRAND, E. M.
The yellow-red virosis of peach: its identification and control.
 Bull. N.Y. St. Agric. Exp. Sta. 1943 : No. 704 : Pp. 17.

The susceptibilities of 45 peach varieties to X-disease have been determined by field trials.

1359. 634.3:575.127.2
A new type of fruit.
 Soviet War News 1943 : No. 575 : p. 4.
 "The Soviet Research Centre for Tropical and Southern Fruits has produced several new types of peaches, plums, and a fruit obtained by crossing a tangerine, a lemon and an orange. It is shaped like a pear, with skin that is easily removed. The flavour is that of a tangerine, with the acid piquancy of a lemon. The fruit ripens in November. The plant stands the winter more successfully than the tangerine, and is very prolific".

NUTS 634.5

1360. TALBERT, T. J. 634.5.00.14(77.8)
Nut tree culture in Missouri.
Bull. Mo. Agric. Exp. Sta. 1942 : No. 454 : Pp. 32.
Varietal yields of the following trees are discussed: walnuts, hickories, chestnuts, chinquapin and hazel.

1361. LITTLE, E. L. (jun.) 634.52:582:001.4(73)
Notes on the nomenclature of *Carya* Nutt.
Amer. Midl. Nat. 1943 : 29 : 493-508.
The nomenclature of the genus is discussed with reference to the International Rules of Botanical Nomenclature.

1362. GRAVES, A. H. 634.53-2.421.9-1.521.6:575.127.2(74.7)
Chestnut breeding work in 1942.
Brooklyn Bot. Gdn Rec. 1943 : 32 : 78-80.
Hybridization of Japanese and American chestnuts is being continued, special attention being devoted to blight resistance.

1363. MIDDLETON, G. K., 634.58.00.14(75.6)
HARVEY, P. H.,
ROBINSON, H. F. and
FARRIOR, J. W.
Peanut breeding and variety studies. (A progress report).
Agron. Inform. Circ. N.C. Agric. Exp. Sta. 1940 : No. 125 : Pp. 9. (Mimeo-graphed).
Field trials have shown that in some localities in North Carolina, Virginia Bunch strains are better yielding than Jumbo Runner while in other places the situation is reversed; these differences are statistically significant.

OTHER FRUITS 634.6*

1364. LONG, E. M. 634.62:581.47:581.145.2
Developmental anatomy of the fruit of the Deglet Noor date.
Bot. Gaz. 1943 : 104 : 426-36.
A record of detailed observations on fruit development in the Deglet Noor date from pollination to maturation. The carpellate inflorescence is also described.

1365. ORTEGA NIETO, J. M. 634.63:581.6:575.22
Estudio preliminar sobre la variabilidad de las características industriales de la aceituna, según su posición en el árbol y de un árbol a otro (una aplicación del análisis de la "varianza" y de la correlación). Consecuencias prácticas. [Preliminary study of the variation in the industrial characteristics of the olive according to position on the tree and from tree to tree. (An application of the analysis of variance and of correlation).
**Practical consequences.Bol. Inst. Invest. Agron., Madr. 1943 : No. 8 : 81-99.
The variation in fruit weight, dry matter and oil content was determined in samples of fruit from different parts of the same tree and from different trees of the same variety and the results analysed statistically. Great variations from tree to tree were found in the variety Picual, the coefficient of variation being 7.49%. There was a negative correlation between the yield of a tree and the oil content of its fruits.**

1366. 634.653:575(79.4)
Report of the Variety Committee 1942.
Yearb. Calif. Avocado Soc. 1942 : 13-17.
The "experimental" varieties described in this year's report are Encanada, Macpherson and Nowels. Brief descriptions are also given of a number of other varieties including most of the "promising new varieties" mentioned last year (cf. "Plant Breeding Abstracts", Vol. XII, Abst. 1188). Information is presented on production trends and registered varieties, and some new Florida varieties which were not included in the list given in the 1939 Yearbook.

* See also Abst. 1242.

1367. LAMMERTS, W. E. 634.653:575(79.4)
Progress report on avocado breeding.
Yearb. Calif. Avocado Soc. 1942 : 36-41.
The progress made in the breeding programme during 1940 and 1941, which was begun in 1939 (cf. "Plant Breeding Abstracts", Vol. XI, Abst. 803) is presented in this paper. The results of the two years' work show that young tubbed avocado trees can be used for breeding and that pollination can be effected by hand or by placing tubbed trees in screen cages with bees, the best time for making controlled pollinations being towards the end of the flowering period of any given variety. Fuerte was found to be a poor female but satisfactory pollen parent. Hand pollinations, at least with flowers of the A group varieties, can be undertaken without emasculation if these flowers are protected by screen cages from the insects which pollinate them in the field. Seedling progeny from a number of varieties including the Fuerte were observed in the field and a tendency of a seedling to resemble its parent was noted.

1368. POPENOE, W. 634.653-1.524(72)
Aguacates de China.
Yearb. Calif. Avocado Soc. 1942 : 27-32.
The author presents an account of some avocado trees named "Aguacate de China" which he observed in Mexico. The trees bear fruit which appear to be of Fuerte character. He considers that a further study should be made because of the possibility of finding in Mexico varieties of Fuerte character with as good quality and better productiveness.

1369. KNOWLES, D., 634.711:581.6(78.4)
GROTTODDEN, O. and
LONG, T. E.
Freezing preservation of North Dakota-grown raspberries.
Bi-m. Bull. N. Dak. Agric. Exp. Sta. 1943 : 5 : No. 5 : 17-19.
The behaviour of raspberry varieties during freezing is discussed.

1370. HAHN, G. G. 634.722-2.452-1.521.6(73)
Blister rust relations of cultivated species of red currants.
Phytopathology 1943 : 33 : 341-53.
It is pointed out that cultivated varieties of red currant are drawn from the three species: *Ribes petraeum*, *R. rubrum* and *R. sativum*. Most recommended varieties are derived from the latter species and are very susceptible to blister-rust (*Cronartium ribicola*). The continental European variety Holländische Rote [Red Dutch—not the same as the English and American varieties known by this name] and Viking (Rød Hollandsk Druerips), both probably derived from *R. petraeum*, are immune and varieties drawn from *R. rubrum* are moderately or highly resistant.

1371. KUZ'MIN, A. JA. 634.723:575.127.5:634.725
634.722:575.127.5:634.723
(The role of the intermediary in hybridizing currants with goose-berries).
Sovetskaja Botanika (Soviet Botany) 1941 : No. 1-2 : 14-23.
Forty hybrid plants were obtained in 1933 by pollinating seedlings of the Siberian blackcurrant with a mixture of gooseberry pollen. The hybrids were vigorous, spineless and resistant to mildew. The first fruits were borne in 1936, and from two berries three seeds were obtained, giving rise to one rather weak seedling. In the following year 26 fruits were obtained and one further seedling was produced. The number of fruits and of fertile seeds increased somewhat in later years as the plants grew older. The use of an "intermediary" or bridging hybrid was also tried. The first formed flowers of a second generation seedling of the hybrid *Ribes nigrum* x *R. dikuscha* were pollinated with pollen from the gooseberry Zelenyi Butyločnyi (Green Bottle). A 59% set was obtained. The same pollen was also used to pollinate the first flowers of a seedling of *R. nigrum* itself; the set was 18%. When the two crosses were repeated the following year the sets were only 13.4% and 13.6% respectively and became progressively less in succeeding years as the trees became older. The red currant Kazyrgan, a hybrid between the series *Rubra* and *Petraea*, was crossed with a

number of different blackcurrants and gooseberries. Better sets were obtained when the flowers were emasculated before pollinating than when pollination was performed without emasculation.

The red currant x gooseberry hybrids flowered in the second or third year and the flowers were pollinated with a mixture of pollen of blackcurrant and gooseberry. Twenty-two fruits were obtained from nine hybrids; they varied in form, being about the size of a blackcurrant and intermediate in flavour. Some of the hybrids flowered a second time on the autumn wood.

The red currant x blackcurrant hybrids flowered in their third year. One fruit was obtained by pollinating with a mixture of black and red currant pollen, and from it one hybrid plant was raised.

The use of the "intermediary" not only enabled more hybrids to be obtained but was found to have the further effect of making the hybrids more vigorous in growth; many of them grew to a height of 50 or 60 cm. in the first year.

The low fertility of the hybrids is ascribed to the absence of bees for pollination. Entirely new characters, such as "dichotomous" branching, appeared in some of the hybrids.

A note at the end of the article refers to the production by I. A. Tolmačev of fertile hybrids by crossing the Kazyrgan currant with gooseberry and with blackcurrant. One seedling from the latter cross bore abundant fruits in clusters up to 25 cm. in length; the fruits were somewhat larger than a blackcurrant and contained normally developed seeds.

1372. WALDO, G. F.

634.75:575(79.5)

The Brightmore strawberry.

Sta. Circ. Ore. Agric. Exp. Sta. 1942 : No. 263 : Pp. 3. (Mimeographed).

The Brightmore strawberry is recommended for trial in the Pacific Northwest region of the U.S.A. This variety was selected from a cross between Blakemore and Ore. 154, a seedling of a cross between Ettersburg 121 and Marshall, and has been tested at various places in the states Oregon and Washington. Mention is made of the places where the plant has shown the qualities productiveness, vigour, and virus disease resistance; it is however susceptible to the red stele root rot disease caused by *Phytophthora Fragariae*. The fruits have a uniform shape with firm, medium red coloured flesh, and possess preserving qualities superior to those of Marshall.

1373. HAVIS, A. L.

634.75:581.143

A developmental analysis of the strawberry fruit.

Amer. J. Bot. 1943 : 30 : 311-14.

An investigation of the development of the fruit in the four varieties: Aberdeen, Blakemore, Catskill and Howard failed to reveal statistically significant varietal differences. Increase in size of the fruit, especially in the later stages, is due principally to cell enlargement, but cell-division occurs all through the period of growth.

1374. FISTER, L. A.

634.75:581.6:577(76.8)

Tennessee Shipper strawberry.

Circ. Tenn. Agric. Exp. Sta. 1941 : No. 76 : Pp. 4.

The variety Tennessee Shipper, a selection from the cross Missionary ♀ x Blakemore ♂, is recommended; it yields well and survives carriage with little injury.

1375. CLARK, J. H.

634.75:581.6:575(79.4)

Four New Jersey strawberry varieties receive names.

N.J. St. Hort. Soc. News 1943 : 24 : 1465, 1470.

Four recent varieties have received names. Julymorn (N.J. 225) is a selection from the cross Redheat x N.J. 5; it yields well, matures very late in the season, is not resistant to red stele and has a type of fruit suitable for freezing. Crimson Glow (N.J. 311) arose from Fairfax x N.J. 51 (Pearl x Aberdeen); its fruit quality is high and the pedicel breaks readily behind the calyx, thus facilitating picking. It is mainly suitable for home growing. Sparkle (N.J. 312) comes from Fairfax x Aberdeen; it is very resistant to red stele, freezes well and produces a large number of fruit per cluster. Redwing (N.J. 347) was selected from the cross Fairfax x N.J. 46 (Pearl x Aberdeen); this is a medium-late variety which freezes well.

1376. CLARK, J. H.

634.75:581.6:575(74.9)

Another New Jersey strawberry.

N.J. St. Hort. Soc. News 1942 : 23 : p. 1385.

N.J. 312 is a new variety obtained by selecting progeny of the cross Fairfax x Aberdeen; it is late-maturing, of good quality and resistant to red stele.

1377. FISTER, L. A. and
DRAIN, B. D. 634.75:581.6:575.12
Tennessee Beauty strawberry.

Circ. Univ. Tenn. Agric. Exp. Sta. 1942 : No. 81 : Pp. 4.

The variety Tennessee Beauty, a selection from the cross Missionary ♀ x Premier ♂ is recommended on account of its high quality and yield. It tends to mature late and transports well.

1378. JEFFERS, W. F. 634.75-2.411.4-1.521.6:575(73)
Further progress in breeding strawberries for resistance to red stele.

Trans. Peninsula Hort. Soc. 1942 : 32 : No. 5 : 70-71.

Strawberries have been selected for resistance to red stele (*Phytophthora Fragariae*) and the selections tested by artificial inoculation with zoospore suspensions. Many resistant lines have been obtained, and the hybrid Aberdeen x Fairfax is, in addition, high yielding and has good quality fruit.

1379. ANDERSON, H. W. 634.75-2.411.4-1.521.6:575(77.3)
Red stele root rot of the strawberry.
Trans. Ill. Hort. Soc. 1940 : 74 : 383-93.

COLBY, A. S.

Some recent developments in strawberry growing.

Ibid. 1940 : 74 : 393-405.

Contained in the first paper is a description of the life history of the fungus *Phytophthora Fragariae*, which causes the disease known as red stele root rot, and of the symptoms shown by the diseased plants; an account is given of the search for resistant varieties suitable for Illinois, which was undertaken by the above two authors, separately, and in co-operation, over a period of several years.

The early tests showed that the variety Aberdeen was highly resistant while the varieties Redheart and Mastodon were partly resistant.

Aberdeen was crossed with Redheart, in the Edgar County and with Mastodon, at Urbana, and in each case a number of selections were made which showed immunity or high resistance to the disease.

A variety from the cross Aberdeen x Premier, and named Pathfinder, was obtained from the New Jersey A.E.S. and grown in the Edgar County, where it proved highly resistant and adaptable to local conditions.

In the second paper, the author presents, in addition to a brief account of the above work on resistance, a review of the old and new varieties which have been produced by breeding. In this review he mentions that three new strawberry hybrids of U.S. Department of Agriculture origin, may prove of value for Illinois and nearby states. These are, (1) Maytime (Missionary x Fairfax), which is earlier than Blakemore and gives a good yield of firm fruit of sweeter taste and deeper colour than those of this variety, (2) Starbright (Chesapeake x Fairfax), which is said to be a vigorous, midseason, long-season variety, giving a fair yield of fruit of high quality and great beauty, and (3) Redstar (also Chesapeake x Fairfax), which is a vigorous, very late variety and gives a good yield of firm and bright red coloured fruit of high quality.

VITICULTURE 634.8

1380. RODRIGUES, A. 634.835:581.45:575.12
Acérra do valor taxonómico do número de dentes da fôlha na separaçao de
dois híbridos do género *Vitis* L. (On the taxonomic value of the number
of teeth on the leaf in separating two hybrids of the genus *Vitis* L.).
Agron. Lusitana 1941 : 3 : 325-40.

RODRIGUES, A.

Variações do recorte da fôlha da videira. (Variations in the outline of
the vine leaf).

Ibid. 1941:3:189-93.

Leaves of two Riparia x Rupestris hybrids and of the two parents were examined. The

differences between the hybrids in the number of teeth on the various sections of the leaf margin were highly significant and it is concluded that since this character is formed very early in development it is less subject to environmental influences than other characters and hence provides a valuable diagnostic character.

1381. MAGOON, C. A. and
SNYDER, E. 634.835:581.6(73)
Grapes for different regions.

Fmr's Bull. U.S. Dep. Agric. 1943 : No. 1936 : Pp. 38.

This bulletin lists the American grape varieties in cultivation to-day. Each variety is described and the region to which it is best adapted is indicated.

1382. VASCONCELLOS, J. DE CARVALHO E,
SANTA BARBARA, L. and
BAPTISTA, A. 634.835:582
Castas de videira: seu estudo botanico. (**Varieties of vine: their botanical study.**)

Rev. Agron. Lisboa 1942 : 30 : 214-75.

The descriptions published in earlier numbers of the series are continued (cf. "Plant Breeding Abstracts", Vol. XIII, Abst. 328).

FORESTRY 634.9

1383. 634.97:575(48.5)
Tillvaratagande och förädling av mindervärdigt virke samt avfalls- och biprodukter i skogsindustriens. (**Exploitation and improvement of inferior wood and waste and by-products in the timber industry.**)
Industriens Utredningsinstitut Norrlandsutredningen Stockholm 1942 :
Pp. 328.

This report contains on pp. 269-78 an article* by Prof. N. Sylvén entitled "Växtförädling av skogsträd" (Breeding forest trees), an abstract of which is given below:—

The early history of forest tree breeding in Sweden and the objects of the Forest Tree Breeding Association founded in 1936, are outlined.

Quality, quantity and vigorous and rapid growth are specially important aims in breeding policy which must also consider the particular requirements of the various timber industries. The methods adopted are direct selection (supplemented by individual progeny tests), hybridization, "transgression breeding" and chromosome alterations.

Since natural populations of the main Swedish forest trees are still in existence the breeder engaged in selection need only continue the work of selection that has been achieved by nature, but he requires a thorough knowledge of all the different forms and varieties and an investigation of the main Swedish forest trees was undertaken by the Association.

Valuable comb and other spruce types are described.

Work has been done on hardness of spruce, oak, beech, ash and aspen (both the long and short-day type).

Populations of forest trees have been shown to be genetically mixed as regards resistance to disease. At Ekebo the progenies of a number of healthy trees found in an otherwise badly infected stand are under observation with a view to ultimate selection of resistant individuals. The value of artificial crossing has been demonstrated in the results obtained from crosses between various birch types and also different species of alder, larch, and other foreign conifers. The merits of aspen and poplar hybrids in exceeding both parents in growth increase and of polyploids, and of 57-chromosome and 76-chromosome giant aspens are discussed.

Colchicine treatment has been applied to numerous tree species and results of permanent practical value are already foreseen. Artificial illumination and freezing, strangulation to induce early flowering, and new methods of grafting are among the modern aids that can be used to accelerate forest tree improvement.

Chemical studies of the various timbers are also valuable as a basis for selective breeding.

* An abridged translation of this article is on file at the Bureau.

1384. PETTERSON, H.,
 MALMSTRÖM, C. and
 TRÄGÅRDH, I. 634.97:575(48.5)
 Redogörelse för verksamheten vid Statens Skogsförsöksanstalt under år
 1939. (Report on the work of the State Institute of Experimental
 Forestry during 1939).

Medd. Skogsförsöksanst. Stockh. 1940-41 : No. 32 : 381-89.

PETTERSON, H.,
 MALMSTRÖM, C. and
 TRÄGÅRDH, I.

Redogörelse för verksamheten vid Statens Skogsförsöksanstalt under år
 1940. (Report on the work of the State Institute of Experimental
 Forestry during 1940).

Ibid. 1940-41 : No. 32 : 390-95.

In these two reports reference is made to Langlet's genetical studies, some being in conjunction with international provenance experiments in which the Swedish State Institute of Experimental Forestry is taking part. The same investigator has also begun new provenance experiments in Västerbotten for a study of climatic races of forest trees and he is studying the progeny of pine and spruce of German origin grown in Sweden and experimentally induced intensification of winter colouring in pine from various localities (cf. Abst. 1391).

1385. SYLVEÅN, N. 634.97:575(48.5)
 Föreningen för växtförädling av skogsträd. Styrelseberättelse för år 1942.
 (The Association for Forest Tree Breeding: Report of the Board
 of Management for the year 1942).
 Svensk PappTidn. 1943 : 46 : 187-89.

This report (which contains the annual financial statement) deals with the resources of the Institute, including the administration of grants and other funds, problems of staff and the provision of buildings and equipment at various centres where forest tree breeding is carried on.

1386. KRAMER, P. J. 634.97:581.143(73)
 Amount and duration of growth of various species of tree seedlings.
 Plant Physiol. 1943 : 18 : 239-51.

A three year experiment on the growth of eleven species of tree seedlings is described and it is found that the shape of the growth curve is determined more by internal factors than by external. Cessation of growth was sometimes due to decreasing photoperiod but in other cases this factor was inoperative.

1387. FLORY, W. S. (jun.) and 634.972.1:575.125:581.165.71(76.4)
 BRISON, F. R. Propagation of a rapid growing semi-evergreen hybrid oak.
 Bull. Tex. Agric. Exp. Sta. 1942 : No. 612 : Pp. 32.

The hybrid oak obtained from the cross *Quercus virginiana* x *Q. lyrata* is described. It shows marked hybrid vigour and can be propagated by grafting on to suitable stocks.

1388. BUCHHOLZ, J. T. 634.972.1:581.48
 Multi-seeded acorns.
 Trans. Ill. Acad. Sci. 1941 : 34 : 99-101.

A Southern red oak, *Quercus falcata*, growing in Conway, Arkansas, bears acorns each containing several viable seeds. This condition, which has persisted over a period of several years, is described and discussed in some detail.

1389. VASSILIEV, V. N. 634.972.6:576.16
 (Systematics and geography of the far eastern birches).
 J. Bot. U.R.S.S. 1942 : 27 : 3-19.
 VASSILIEV, V. N.
 (Notes on the systematics and origin of certain Japanese birches).
 Ibid. 1942 : 27 : 77-80.

The systematics and phylogeny of the section *Ermanii* (Nakar) V. Vassil. of the genus *Betula* are

discussed. The most primitive species are found in eastern Asia which is regarded as the centre of origin of the section.

In the second article two new species are described.

1390. BEARD, J. S. 634.973:576.16:581.6(72.98)
The importance of race in teak, *Tectona grandis* L.

Caribbean Forester 1943 : 4 : 135-39.

Marked differences in quality have been observed between the two types of teak established in Trinidad. The race originally obtained from Tenasserim (Lower Burma) is superior to the importation from Shencottah (Travancore).

1391. LANGLET, O. 634.975:575.061.1:575.3
Kulturförsök med tysk gran av första och andra generationen. (Cultural experiments with German spruce of the first and second generation).

Medd. Skogsförsöksanst. Stockh. 1940-1941 : No. 32 : 361-80.

The problem for solution was to find out whether differences between trees from different geographical localities were entirely hereditary or partly due to the mother trees having matured in different environments.

In the course of the investigation a comparison made between plants derived from Halland spruce and a stand of German spruce in Halland showed (1) that the superior growth rate of the German spruce was transmitted to its progeny even when they grew up and set seed in Sweden, which is considerably further north than their home locality; and (2) that the dry matter content of spruce needles is a heritable character.

Two main experiments were made to compare (1) second generation Central European ("German spruce") grown in Sweden with spruce from mixed seed from Halland, and (2) the first generation of German spruce with spruce from Drängsered in Halland.

The final results showed that the differences between southern Swedish and central European spruce ("German spruce") persisted unchanged in degree in the second generation even though the first generation was grown in Sweden and its seed had matured under southern Swedish conditions. Since the trees were only 1-year old, possible effects of "Dauermodifikation" would have been readily detected and this factor can therefore be excluded.

Cross-pollination as a possible factor tending to counteract differences due to provenance is discussed with reference to the present experiments and the findings of previous investigators in Switzerland and Denmark and apparently conflicting results are reconciled. The author's results also showed that the growth rate and the water content (and dry matter content) of the needles are conditioned entirely by genetic factors operating in conjunction with the prevailing environment, but are not connected with direct effects of environment upon a preceding generation.

1392. 634.975:575.12(48.5)
Föreningen för växtförädling av skogsträd. (The Association for Forest Tree Breeding).

Svensk PappTidn. 1943 : 46 : p. 137.

A report of a meeting.

The importance of the larch in Swedish forest development will depend on the confirmation of the practical value of its timber and the fixing of suitable market prices. Selections should yield types well adapted to Swedish conditions.

To obtain forms adapted to central and southern Sweden, crosses between *Larix sibirica* and *L. europaea* are recommended, while *L. davurica* is thought to have considerable possibilities for the Norrland woods lying further inland at a higher altitude. Trees would be obtained from Northern Siberia.

The Association is conducting large scale work on the larch.

1393. EKLUNDH, C. 634.975:575.127.2(48.5)
Artkorsningar inom sl. *Abies*, *Pseudotsuga*, *Picea*, *Larix*, *Pinus* och *Chamaecyparis*, tillhörande fam. Pinaceae. (Species crosses within the genera *Abies*, *Pseudotsuga*, *Picea*, *Larix*, *Pinus* and *Chamaecyparis*, belonging to the family Pinaceae).

Svensk PappTidn. 1943 : 46 : 101-05, 130-33.

Fifty-four crosses were made within *Abies*, *Picea*, *Pinus*, *Pseudotsuga* and *Chamaecyparis* at

Kiviks Esperöd (Scania). To facilitate pollen collection branches with ♂ flowers were forced at a suitably low temperature in the greenhouse at the Ekebo Institute. The method of pollen storage and the technique of pollination (including blowing pollen from a glass tube with a very fine point inserted through a tiny hole made in the bags protecting the flowers) is described in detail, with notes also on the time when the ♂ and ♀ flowers of the various species were ready for use in hybridization. The *Picea*, *Pinus* and *Pseudotsuga*, *Abies* species and *Chamaecyparis* *Lawsoniana* all gave abundant pollen but *Ch. obtusa* and *Ch. nootkatensis* gave little, partly owing to the fact that their ♂ flowers are so small but also because they apparently suffer more from heat. The pollen varied greatly in quality as was borne out by the failure to give the staining reaction and the lack of uniformity in the shape and size of the grains.

Of the 13 species tested only *Picea mariana* and *P. sitchensis* gave 95–100% tolerably good pollen.

Full details of the crosses and their results are tabulated.

From the 46 crosses within *Abies*, *Picea*, *Pseudotsuga* and *Chamaecyparis* 41 normal cones were produced. No difference was observed between cones from artificially and naturally pollinated trees.

Six *Abies*, two *Picea* and three *Chamaecyparis* crosses gave matured seed. The rest of the seed consisted of empty grains, though exhibiting no external differences as compared with mature seed.

Details of the set of seed in various crosses are given and of the best methods of sowing and raising the seedlings.

The number of plants obtained from the crosses was small and at such an early stage it is impossible to decide whether the new combinations are superior to the parents or whether there is any heterosis; the mean increase in height of the progeny is on the whole equal to that of plants from open-pollinated seed. At 6 months the plants appeared frequently to be intermediate, with one parent species perhaps predominating in one character, and the other parent in another.

In the cross *Picea asperata* x *P. obovata* the buds are ovoid-acute, as in the ♀ parent, but lack resin; the terminal bud has ridged, pointed hairy scales at the base as in *P. obovata*; the needles resemble those of *P. asperata*.

In *P. sitchensis* x *P. Omorika* the buds resemble those of the maternal species with long subulate basal scales.

The hybrid *Abies sibirica* x *A. Veitchii olivacea* resembles the maternal species but has darker buds and stiffer needles.

Some inter-specific larch hybrids are known to be definitely superior to the parent forms. The material used in the larch crosses was a 20-year old stand in the Svalöf park of the Association comprising *L. leptolepis*, *L. decidua*, *L. Gmelini olgensis* and *L. Gmelini japonica*, one older tree of *L. sibirica* nearby and selected trees in the larch plantation at Grensholm in Östergötland. In the Svalöf experiments isolation of ♀ flowers, pollen collection and pollination were carried out as described before and again bud damage by too high a temperature or intense sunshine had to be guarded against.

In all, 10 crosses were made with *L. sibirica*, *L. leptolepis*, *L. decidua* and *L. Gmelini japonica* as the ♀ parents and *L. sibirica*, *L. decidua* and *L. Gmelini* as pollen parents. Also, some branches were isolated for selfing. The cones of *L. leptolepis* ripened about 3 weeks later than the others. Seed was obtained from all the crosses except two and seedlings were reared from the following 5 combinations:—

L. sibirica x *L. decidua* gave only two plants, both very vigorous.

L. leptolepis x *L. decidua* is the much discussed hybrid between the Japanese x European larch. The plants are intermediate and vary considerably in growth rate and vigour. The largest is 21.5 cm. tall.

The four *L. leptolepis* x *L. Gmelini japonica* plants average 12.5 cm., i.e. intermediate in height between the parents.

L. decidua x *L. Gmelini japonica* gave one strong seedling, 41.2 cm. tall, with light yellow-violet coloured branches and soft needles which are rounded on the upper surface and ridged beneath with 5–7 rows of stomata; the terminal buds are small, pointed and glaucous, the lateral ones, small, round, light brown and resinous.

L. leptolepis x *L. sibirica* gave 2 seedlings, 24.8 and 5.8 cm. tall respectively, with yellowish grey stems (as in *L. sibirica*), light green and very pointed needles, terminal buds rounded and

with fimbriate, dark brown scales; and lateral buds large, ovoid, resinous and dark brown without the hairy ring round the needles found in *L. sibirica*.

At Grensholm *L. Gmelini*, *L. Gmelini olgensis*, *L. Gmelini japonica*, *L. Gmelini Principis Rupprechtii*, *L. decidua*, *L. sibirica* and *L. leptolepis* were used as ♀ parents and *L. Gmelini*, *L. Gmelini olgensis*, *L. decidua*, *L. sibirica* and *L. leptolepis* as ♂ parents. Though well-grown and mature cones were obtained, the seeds were well developed but empty. Matured seed was obtained only from the cross *L. Gmelini japonica* x *L. decidua*, 92 seeds being obtained. Two ripened and one germinated. Two types, *L. Gmelini* and *L. Gmelini Principis Rupprechtii*, when self-pollinated gave full seeds. The percentage of mature seed in all 3 cases was very low and the 4 seeds set by *L. Gmelini* failed to germinate. The sole plant from this lot of crosses resembled the ♀ parent *L. Gmelini japonica* with dark violet stem and somewhat hairy branches.

The importance of interspecific hybridization in forest tree improvement is stressed in spite of its inherent difficulties. It is suggested that an ideal method in such work would be to have an arboretum of dwarf trees of the various species required which could be grown as bottle or other grafts or on their own roots and in which flowering could be induced by "strangulation" planting in pots or buckets. Thus it would be possible to acquire a thorough knowledge of the breeding material and to plan further developments and test new crosses. In conjunction therewith field experiments should be conducted with the foreign species already in Swedish forests and parks and their possibilities in different latitudes, climates and soils ascertained.

1394. DOYLE, J. and

KANE, A.

634.975:581.162.3

Pollination in *Tsuga Pattoniana* and in species of *Abies* and *Picea*.

Sci. Proc. R. Dublin Soc. 1943 : 23 : 57-70.

Pollination behaviour is described for species in the genera *Picea*, *Abies* and *Tsuga*. *Tsuga Pattoniana* has a stigmatic micropylar flare and differs from other described species of the genus in having winged pollen. In *Abies Nordmanniana*, pollen dormancy may extend through eight weeks before germination. *Picea orientalis* has winged pollen which, after wetting, sinks through the pollination fluid on to the nucellus.

1395. MITCHELL, H. L.

634.975:581.6:575:633.94

The development of a high yielding strain of naval stores pine—to increase the output of oleoresin per tree.

Naval Stores Rev. 1943 : 52 (7) : 10, 12.

[From Biol. Abst. 1943 : 17 : Sect. D : Abst. 17215].

MITCHELL, H. L.,

SCHOPMEYER, C. S. and

DORMAN, K. W.

Pedigreed pine for naval stores production.

Science 1942 : 96 : 559-60.

According to the first of these papers, in 1941, 7000 cuttings were collected from 18-20 and 30-40 year old trees of slash pine (*Pinus caribaea*) and long leaf pine (*P. palustris*), chosen in the naval stores belt of the south east for their unusually high yield of oleoresin or gum. Over 90% rooting was obtained within 4 weeks after planting by providing a favourable environment and treatment of the cutting with a complete nutrient solution and plant hormones. Preliminary results of grafting suggest that high yielding strains can be relatively easily propagated by the method described.

The second paper covers the same work. The data collected suggest that the superior gum output of some of the selected trees may be due largely to hereditary factors.

VEGETABLES 635*

1396. LAMM, R.

635.00.14(48.5)

Nyare undersökningar på köksväxtodlingens område. (Recent investigations on vegetable culture).

Sverig. Pomol. Fören. Årsskr. 1942 : 43 : 87-106.

This review deals mainly with trials of new varieties and strains of vegetables in Sweden and other countries.

Though the survey is stated not to include work on breeding or problems mainly of theoretical

* See also Abst. 1339.

interest, the observations on the origin and performance (yield, quality and vitamin content in particular, disease resistance, storage reactions, etc.) of different vegetables should interest the plant breeder.

1397. SCOTT, G. W. 635.25:575(73)

Meet the persevering onion breeders.

Sth. Seedsman 1943 : 6 : No. 4 : 12, 33, 37, 40.

A detailed account is given of the breeding methods which led to the production of onion varieties such as Early Grano and Crystal Grano (cf. "Plant Breeding Abstracts", Vol. XIII, Abst. 970) adapted to the conditions prevailing in the southern states of the U.S.A.

1398. MIANI, G. 635.26:576.312.315

Trabanti e nucleoli nel gen. *Allium*. (Trabants and nucleoli in the genus *Allium*).

Ann. Bot. Roma 1941 : 22 : No. 2 : 11-27.

The author has investigated 87 species of the genus and has confirmed the existence of a strict relationship between the SAT chromosomes and the nucleoli and between the number of trabants and the number of nucleoli.

1399. DE ROS RAMIS, J. 635.34(46)

Variedades comerciales de la col. (Commercial cabbage varieties).

Agricultura, Madrid 1943 : 12 : 62-65.

Descriptions and illustrations are given of a number of Spanish types of cabbages, broccolis and cauliflowers, and of certain hybrid forms.

1400. HOPPER, W. E. R. 635.52:581.162

635.54:581.162

Seed formation, germination, and post-germination development in certain *Cichorieae*.

Trans. Ill. Acad. Sci. 1941 : 34 : 70-72. (Abst.).

It is shown that parthenogenesis occurs in *Taraxacum officinale* but not in *Lactuca Ludoviciana* and *Cichorium Intybus*.

Experiments undertaken to determine the factors influencing seed germination and dormancy in *L. scariola* and *L. Ludoviciana* revealed that the main factor affecting germination is temperature.

It was also shown that *L. scariola* is a long day plant.

1401. WALKER, M. N. 635.61:581.162.3:578.08

A useful pollination method for water-melons.

J. Hered. 1943 : 34 : 11-13.

Details are given of an effective method for the outdoor pollination of water-melons which involved a wire frame covered by a coarse muslin bag. R. M. I.

1402. POOLE, C. F. 635.615:575.11

This amazing science of plant breeding.

Sth. Seedsman 1943 : 6 : No. 6 : 9, 54-55.

Genetical investigations of the water-melon are summarized. Resistance to anthracnose is controlled by one gene while resistance to wilt depends on three interacting factors. Two genes determine seed size and four the colour of the testa. Gene *L* (long seed) and gene *W* (white seed) are linked. Fruit shape, controlled by one gene, is linked to the factors determining monoecious or andromonoecious flowers. The inheritance of most of the colours of the fruit skin is determined by single factors. The "Sun, Moon and Stars" pattern is only inherited through the female parent, all progeny of such a parent receiving the pattern.

1403. ORTON, C. R. 635.615-2.484-1.521.6:575.12(75.5)

634.975-2.452-1.521.6(75.5)

Epistle to the farm.

Bull. W. Va Agric. Exp. Sta. 1943 : No. 307 : Pp. 56.

Two groups of wilt-resistant water-melons are being developed, one from a cross between Early Fordhook and a Russian melon and the other from crosses between a resistant strain of Stone Mountain and the varieties Improved Clover Belle, Hawksbury and Iowa Belle.

A variety of red cedar resistant to apple rust has remained immune after fifteen years.

1404. SINNOTT, E. W. and
FRANKLIN, A. H. 635.62:576.312.35:581.47:575-181.

A developmental analysis of the fruit in tetraploid as compared with diploid races of cucurbits.

Amer. J. Bot. 1943 : 30 : 87-94.

Diploid races of *Cucurbita Pepo* and *Lagenaria vulgaris* were compared with tetraploid races, obtained by colchicine treatment, and it was found that from the beginning of development until about the time of flowering the cells and organ primordia of the tetraploids are about twice as large as in the diploids. Also in the tetraploids, cell division persists in a given tissue to a cell size and ovary size about twice that in corresponding diploid tissue. The methods used in analysing the development of the ovary and cell size are described. Between flowering and maturity the diploids overcome the lead of the tetraploids so that the volume of the mature fruit and of its cells is approximately equal in both and the "gigas" condition apparent in the earlier stages of development disappears. It is therefore suggested that those polyploid series in which no difference in cell or organ size have been found at maturity between tetraploid and diploid, might with advantage be analysed on the lines described in the present paper. (Cf. "Plant Breeding Abstracts", Vol. IX, Abst. 872).

1405. BRASHER, E. P. 635.64(73)

More tomatoes for the war effort.

Trans. Peninsula Hort. Soc. 1942 : 32 : No. 5 : 71-78.

The variety Rutgers is recommended for tomato canning on account of its quality and high yield. Field trials indicated that the yield of the new Pan American variety was less than that of Rutgers.

1406. 635.64:575(78.4)

Bounty tomato.

Bi-m Bull. N. Dak. Agric. Exp. Sta. 1942 : 4 : No. 4 : p. 12.

A further satisfactory report is given on the high yielding, good quality, early tomato variety Bounty, which was introduced by the North Dakota Agricultural Experiment Station in 1941. (Cf. "Plant Breeding Abstracts", Vol. XI, Abst. 1129).

1407. 635.64:581.48:578.08

Seedless tomatoes.

Science Suppl. 1943 : 97 : No. 2509 : p. 6.

A note on seedless tomatoes produced by treating the plants before the flower opened with the fumes of naphthoxyacetic acid. The flowers were subsequently hand pollinated and the resulting fruits except for their lack of seeds could not be distinguished from the controls.

R. M. I.

1408. ANDROSOVA, M. P. 635.64-2.111-1.521.6:575.12

(Cold resistance of tomato plants).

Vestnik Ovočevodstvo i Kartofel' (Vegetable and Potato Journal) 1940 : No. 2 : 116-18.

The variety Bison withstood temperatures of -3° C. better than any of the other varieties tested. Hybrids of Earliana x Ficorazzi, Matador x Sparks x Early Preserving and Panderosa Dwarf x Pieretta x Oktjabrenok were all hardier than Bison.

1409. 635.64-2.482-1.521.6:575

BAILEY, D. M. 635.64-2.484-1.521.6:575

The Essary tomato.

Circ. Univ. Tenn. Agric. Exp. Sta. 1940 : No. 71 : Pp. 4.

The variety Essary, a selection from Marglobe, is recommended; it has a slightly higher yield than the latter variety and has some resistance to wilt and to defoliation caused by *Septoria*.

1410. BLOOD, H. L. 635.64-2.8-1.521.6:575.127.2

Curly top, the most serious menace to tomato production in Utah.

Fm Home Sci. Utah 1942 : 3 : No. 1 : 8-9, 11.

The difficulty of producing a tomato resistant to curly top is discussed. No selections from *Lycopersicon esculentum* have shown more than a slight resistance but some species of the sub-genus *Eriopersicon* are highly resistant. Crossing between these sub-genera is a promising line of approach if hybrid sterility can be overcome.

1411. MATTSON, H. 635.64.00.14(73)
Bounty tomato in standard yield trials in 1940 and 1941.

Bull. N. Dak. Agric. Exp. Sta. 1942 : No. 310 : Pp. 7.

The results of field tests on the variety Bounty are given for various localities. In North Dakota and Manitoba a yield of 760 bushels per acre of total ripe fruit and 471 bushels of graded ripe fruit was obtained.

1412. ROMSHE, F. A. 635.64.00.14:519.241.1(76.6)
Experiments with greenhouse tomatoes: varieties, cultural methods, and relationship between yield and vegetative vigor.

Bull. Okla. Agric. Exp. Sta. 1942 : No. B-260 : Pp. 30.

Varietal tests show that Michigan State Forcing and Forcing Marglobe are most suitable for greenhouse culture in Oklahoma. The correlations between stem diameter, number of flowers, number of fruits and weights of fruit are discussed and found to vary considerably according to the time of year and the varieties used.

1413. PORTE, W. S. 635.64-2.484-1.521.6
Pan America gets the flag.

Seed World 1943 : 53 : No. 7 : p. 14.

The tomato varieties Pan America, Rutgers and Marglobe are compared.

1414. MOYER, L. S. and FISHMAN, N. M. 635.65:576.16:581.192
The chlorophyll-protein complex II. Species relationships in certain legumes as shown by electric mobility curves.

Bot. Gaz. 1943 : 104 : 449-54.

The technical difficulties of investigating the specificity of plant proteins by physico-chemical or other methods are pointed out and the findings of previous workers on this aspect of plant relationship are examined.

In the present experiment electrophoretic mobility/pH curves were determined for the chlorophyll-protein complex prepared from *Phaseolus vulgaris*, *P. limensis*, *P. coccineus*, *Vigna sesquipedalis*, *Dolichos lablab*, *Glycine max*, *Medicago sativa*, *Trifolium pratense*, *Melilotus alba*, *Vicia Faba* and *Pisum sativum*.

The curves of the complex from these species were found to show close relationship but to differ completely from that for *Aspidistra*.

It is suggested that the complex from each species is characterized by essentially the same protein, slightly altered in certain respects from the rest but retaining enough of its original character to show relationship.

1415. WADE, B. L. 635.652:575(75.7)
New wax beans have what it takes.

Sth. Seedsman 1942 : 5 : No. 10 : 9, 18, 26.

Cooper Wax, a selection from Brittle Wax x a sib of U.S. No. 5 Refugee and Ashley Wax, a selection from (Brittle Wax x a sib of U.S. No. 5 Refugee) x Brittle Wax, are two new wax snap bean varieties which will give good yields of straight and tender pods under adverse weather conditions such as high temperatures.

Cooper Wax shows a resemblance, in many characters, to Brittle Wax, and Ashley Wax, a resemblance to U.S. No. 5 Refugee; both varieties possess the Refugee type of tolerance to powdery mildew, resistance to common bean mosaic and the pods, but not the stems or leaves, are resistant to bacterial spots.

Cooper Wax is recommended for marketing and Ashley Wax for preserving.

1416. CARTER, J. (jun.) 635.652-1.557:632.3(73)
Pinto bean tests in northeastern New Mexico, 1940-42.

Pr. Bull. N. Mex. Coll. Agric. Mech. Arts Agric. Exp. Sta. 1943 : No. 962 : Pp. 2. (Mimeographed).

Yield tests of several new strains of the Pinto bean have been made in three localities in northern New Mexico. College strains Nos 295 and 247 yielded 10% more beans to the acre than local seed and in addition have attractive markings. It is important to take measures to control bacterial blight.

1417. WADE, B. L. 635.652-2-1.521.6:575.12

Logan, a new, hardy snap bean.

Seed World 1943 : 53 : No. 5 : 12-13, 40-41.

The new variety Logan, a selection from a cross between a sister line of U.S. No. 5 Refugee and Stringless Black Valentine, is recommended for the southern states. It will set pods under adverse climatic conditions, is resistant to powdery mildew and common bean mosaic and is tolerant to rust and bacterial blight.

1418. 635.652-2.112-1.521.6:575.12(73)

This new snap bean for the South thrives when going is rough.

Sth. Seedsman 1943 : 6 : No. 4 : p. 24.

A new hardy snap bean named Logan, selected from the cross of a sib of U.S. No. 5 Refugee with Stringless Black Valentine, sets pods and yields under adverse conditions, such as hot weather at the time of blooming, and is thus suitable for growth in the southern states of the U.S.A. The new strain is also resistant to powdery mildew and common bean mosaic and tolerates bacterial blights and rust.

1419. WINGARD, S. A. 635.652-2.452-1.521.6:575.12(73)

High tide of rust resistance.

Sth. Seedsman 1943 : 6 : No. 5 : 18, 42.

A review of the progress made in breeding rust-resistant runner beans is presented. In all the crosses made in Virginia, resistance acts as a simple dominant factor. Hybrid vigour is pronounced in several cases and promising lines are being developed from the crosses: Boston Navy x Improved Goddard and Marblehead x Powell Prolific.

1420. WINGARD, S. A. 635.652-2.452-1.521.6:575.12(75.5)

Victory beans . . . ten timely new varieties.

Sth. Seedsman 1943 : 6 : No. 4 : 9, 36-37.

Ten new runner bean varieties combining rust-resistance with good quality and yield have been named; the selection of these lines has been made rather difficult owing to the factor for resistance being dominant. Virginia Victory No. 1 (from Kentucky Wonder x Brockton Pole) is very prolific and its pods have a better flavour than Kentucky Wonder; it fails however to set many pods in the lower parts of the plant. Virginia Victory No. 2 (selected from Virginia Victory No. 1) is similar to the first but has slightly smaller pods and is not barren below. Virginia No. 3 (selected from Virginia No. 1) is earlier than the parent variety and has slightly smaller pods. Virginia Victory No. 4 (selected from Kentucky Wonder x Brockton Pole) is a very prolific snap bean. Virginia Victory No. 5 (selected from Virginia Victory No. 4 x Alabama No. 24) is exceptionally vigorous but very late. Virginia Victory No. 6 (selected from Kentucky Wonder x Brockton Pole) is a very vigorous variety but the pods tend to be stringy when mature. Virginia Victory No. 7 (selected from Kentucky Wonder x Brockton Pole) is a prolific late strain and Virginia Victory No. 8 (also from Kentucky Wonder x Brockton Pole) is a medium-early prolific variety which has however stringy pods. Virginia Victory No. 9 (selected from Kentucky Wonder x Brockton Pole) produces tender pods and is late-maturing and very prolific while Virginia Victory No. 10 (also from Kentucky Wonder x Brockton Pole) is a vigorous green-pod bean.

1421. MAGRUDER, R. and WESTER, R. E. 635.653:581.6:575(73)

Two new large-podded bush limas.

Seed World 1943 : 53 : No. 5 : 14, 45.

Two new varieties of bush lima bean have been introduced, both characterized by good quality and yield. The first variety, Early Market, is a selection from Early Giant and the second, Fordhook 242, is selected from Fordhook.

1422. SEVERSON, H. 635.653-1.524:576.16(8)

Viva Guatemala. It gave us the lima bean.

Sth. Seedsman 1943 : 6 : No. 5 : 11, 38-39, 46.

A condensed account is given of a paper by W.W. Mackie on the origin and distribution of the lima bean. The various varieties were dispersed by American Indians from a centre of origin in Guatemala. The various races of bean associated with the migratory routes are of importance to the breeder who wishes to select and hybridize for disease resistance.

1423. 635.655:551.556.3:575(47)

Cayuga soybeans to Russia.

Soybean Digest 1943 : 3 : No. 5 : p. 13.

Four bushels of Cayuga soya beans, a variety developed at the Cornell University, have been sent to Russia for trial plantings as a stock feed and food crop. Cool weather and short growing season in Russia resemble the conditions in New York State, to which Cayuga is adapted. The yield of this variety is given as 20 to 25 bushels or more dry beans per acre.

1424. KING, B. M. and 635.655:581.6(77.8)
ALLEN, D. I.**Soybean production in Missouri.**

Bull. Mo. Agric. Exp. Sta. 1942 : No. 445 : Pp. 31.

The varieties of soya bean adapted for growing in Missouri are described.

1425. OVERPECK, J. C. 635.655-1.557(78)
Soybean production in Mexico.
Pr. Bull. N. Mex. Coll. Agric. Mech. Arts Agric. Exp. Sta. 1943 : No. 963 :
Pp. 2. (Mimeographed).

The author reviews the attempts made to grow soya bean crops in New Mexico. He states that black-seeded varieties give the higher yields, but concludes that the hot dry climate of New Mexico makes the growing of this crop unprofitable.

1426. WEISS, M. G. 635.655-2.191:575.113
Inheritance and physiology of efficiency in iron utilization in soybeans.
Genetics 1943 : 28 : 253-68.

Susceptibility to chlorosis caused by iron deficiency is a genetic character. Hybridization experiments with normal varieties carried to the F_3 show that inefficient iron utilization is controlled by a single recessive gene (*fe*). Six chlorotic varieties were investigated and it was demonstrated by hybridization that the controlling genes were allelomorphic.

1427. ELLISOR, L. O. 635.655-2.7-1.521.6
Notes on the biology and control of the velvetbean caterpillar,
Anticarsia gemmatalis Hbn.
Entomological Progress No. 3, Bull. La Agric. Exp. Sta. 1942 : No. 350 :
17-23.

Observations recorded in this paper on the resistance of some soya bean varieties to the velvet-bean caterpillar show that varieties like the avoyelles when planted early in the season develop thick tough leaves by the time the caterpillars appear and so escape injury if an abundant supply of more favourable varieties is present. A soya bean like the Biloxi often escapes injury because its upright position does not afford protection for the moths during the day.

1428. ZAHNLEY, J. W. 635.655.00.14(78.1)
Soybean production in Kansas.

Bull. Kans. Agric. Exp. Sta. 1942 : No. 306 : Pp. 31.

Varietal tests have been made on a large number of soya bean varieties. Only about twelve varieties are recommended for Kansas and detailed descriptions of some of these are given.

1429. WADE, B. L. 635.656:575:578.088
A key to pea varieties.
Circ. U.S. Dep. Agric. 1943 : No. 676 : Pp. 12.

A key for the identification of American garden and canning peas is presented, together with brief comments on the varietal characteristics.

1430. WENT, F. W. 635.656:575.113:581.165.71
Transplantation experiments in peas III.
Bot. Gaz. 1943 : 104 : 460-74.

The experiments recorded deal mainly with growth factor analysis in peas by studying the interaction between scion and stock in grafts and with the technique of grafting. Grafting has also been used to analyse genetic characters by using root stock peas with genetically known aberrant leaf or growth characters to ascertain whether a specific gene affects the growth-factor supply or the reactivity of the tissues. Previous findings of the

author and of de Haan and Gortner are discussed. Experiments of the character Slender (*la*, *lb* according to de Haan) showed this to be a complex case in which the reactivity of the leaves and stems of an Alaska scion on a Slender stock is decreased and that of the stem increased while at the same time there is a decrease of the growth factor content of the seeds and an increase in the caulocaline production of the roots. These pleiotropic effects must, it is asserted, be based on some much more fundamental effect of the Slender gene than that described by de Haan and Gortner.

For the three other genes studied (Stipuleless, Acacia leaf and Rogue) a simple relationship between gene and effect was found. There was no considerable change in the growth factor content of the seeds and practically the whole effect was due to change in the responsiveness of the tissues under control of the gene.

Two possible explanations of the one-sided nature of gene action in affecting growth habit in peas are put forward.

1431. DELWICHE, E. J. 635.656:581.6(77.5)

Wisconsin canning pea trials 1937-1941.

Res. Bull. Wis. Agric. Exp. Sta. 1942 : No. 144 : Pp. 36.

Figures are given for the yield and quality of 26 varieties of canning pea during a five year field trial.

1432. MAYER, L. S. and 635.67:581.6:575.12(78.1)
STRAND, A. B.

A hybrid sweet corn for Tennessee.

Circ. Tenn. Agric. Exp. Sta. 1941 : No. 75 : Pp. 4.

Tennessee Sweet Hybrid is recommended for planting in Kansas; although its yield is slightly inferior to that of Golden Cross Bantam it surpasses that variety in most other respects.

BOOK REVIEWS

MAYER, A. W.

030.8:54

Chemical-technical dictionary. (German-English-French-Russian).

Chemical Publ. Co., Inc., Brooklyn, N.Y. 1942: \$8.00. Pp. 872.

This new American edition of the well known work by A. W. Mayer is evidently a photographic reproduction of the Russian edition which was first published in 1936 at Leningrad. The alphabetical arrangement follows the German language version, the English, French, and Russian equivalents being given in that order for each word. This plan of compilation makes it eminently suitable for those workers that either know or have to deal with all the four languages or the German alone; finding a particular term may be difficult for the person who knows only English, French, or Russian, for, although scientific nomenclature largely consists of the Greek, Latin or hybrid words that follow the Latin alphabet, there are discrepancies between the German alphabetical order and that used in other languages.

Apart from this, the dictionary is admirably produced and contains, in addition to chemical technical terms, a considerable number of definitions which cover such widely divergent fields of knowledge as medicine and mineralogy, physiology and metallurgy, pharmacology, soil science and biochemistry. It should be of great use both to research workers and to abstractors and translators. The quality of the printing and paper, as judged by war-time standards, is satisfactory and the price is not excessive.

H. F.

WALD, A.

519.24

On the principles of statistical inference. Notre Dame Mathematical Lectures I.

Edwards Bros., Inc., Ann Arbor, Michigan 1942: Pp. 49. (Mimeographed.)

These six lectures give an account of some current theories of statistical inference. The first is introductory, the second describes the Neyman-Pearson theory of testing statistical hypotheses, the third R. A. Fisher's theory of estimation and the fourth the theory of confidence intervals. The fifth is concerned with asymptotically most powerful tests and asymptotically shortest confidence intervals and the last with an outline of a general theory of statistical inference.

A sample of n values can always be represented by a point in n dimensions. Neyman and Pearson's theory gives methods for selecting a region in this sample space such that a given hypothesis H_0 about the population sampled may be rejected when the point falls into the region in question. In the "sample space" we can select many regions such that the probability of the sample point falling into any one of them is α (·05 say) when the hypothesis tested (H_0) is true. The best critical region with regard to an alternative hypothesis H_1 is that one of the above regions for which the probability of containing the sample point is a maximum, when H_1 is true.

In some cases the best critical region with regard to all alternatives is the same, in which case the region is called "uniformly best" and the resulting test of significance a uniformly most powerful test. Unfortunately uniformly most powerful tests seldom exist. This led Neyman and Pearson to suggest the use of what are known as unbiased tests in such cases. There are a great many possible unbiased tests and this again led to the selection of two types which possess plausible properties. These are called uniformly most powerful unbiased tests and unbiased tests of Type A. The latter exist under very weak conditions which are fulfilled in most practical cases.

The fact that the first two types of test so seldom exist led the author and others to enquire whether one could more frequently find tests which tend to possess the "uniformly most powerful" property as the size of sample is increased. They found that this was so. Such tests are called asymptotically most powerful and it is shown that where the population involves only a single parameter, unbiased tests of Type A are asymptotically most powerful. The theory of confidence intervals is treated on similar lines to the theory of testing hypotheses, while a more general theory of statistical inference, of which the Neyman-Pearson theory of testing hypotheses and the theory of estimation are both particular cases, is developed.

The style of these lectures is abstract and mathematically rigorous. They will appeal to the mathematical statistician rather than the biologist, who, as a rule, is interested only in the application of the more common tests of significance and their underlying principles. J. O. I.

575:578.08

The production of seed of root crops and vegetables. 631.531.12
 Imperial Agricultural Bureaux Joint Publication, Great Britain, July, 1943:
 No. 5: 3s. Pp. 93.

This useful symposium of information relating to seed production for root and vegetable crops—a subject of paramount importance both now and for the approaching years of reconstruction in Europe and elsewhere—has been published as a joint publication of the Imperial Agricultural Bureaux. The Imperial Bureaux of Horticulture and Plantation Crops, East Malling, of Pastures and Forage Crops, Aberystwyth, and of Plant Breeding and Genetics, Cambridge, have co-operated in its production. Separate articles deal with the following countries: England, Scotland, Holland, Sweden, U.S.A., Canada, Australia, New Zealand, South Africa and the British Colonial Empire. In addition to describing the numerous re-adjustments that have been made in this branch of agriculture since 1939, details are given of the varieties being produced in each country, together with an account of the practical methods used. There is also much information on seed laws and regulations and on the various organizations of the seed merchants and growers in the different countries concerned. It can be purchased from booksellers or from: Imperial Agricultural Bureaux, Central Sales Branch, Agricultural Research Building, Penglais, Aberystwyth.

575.061.3

Proceedings of the Eighth American Scientific Congress held in Washington, May 10-18, 1940. Organization, activities, resolutions, delegations.

Proc. 8th Amer. Sci. Congr. Washington 1940.

The proceedings of the eighth American Scientific Congress are included in twelve volumes of which the first contains a list of the authors and the titles of the papers read. Volume II deals with biological sciences and volume V with agriculture and conservation. The latter includes an historical account of the introduction of the various varieties of sugar cane into Puerto Rico. Volume VIII is devoted to statistics, the majority of the articles referring to social statistics, though there is one dealing with the Cuban sugar industry and another with Brazilian coffee; many of these articles are written by South American authors in Spanish or Portuguese.

ROULET, E.-L. / 575.11.51
Hérédité Mendélienne et analyse combinatoire. (Mendelian heredity and combinatory analysis).

Georg et Cie, Genève 1941: 12 frs. Pp. 193. 3 tables.

The author has applied the method of combinatory analysis to Mendelian laws and illustrated in detail the results when the method is applied to the descendants of the following combinations: (1) P_1 and P_0 , the respective parents being monomeric heterozygotes; (2) P_1 heterozygous and P_2 homozygous dominant; (3) P_1 heterozygous and P_2 homozygous recessive, (4) P_1 and P_2 "homoheterozygotes" and (5) P_1 and P_2 polymeric heterozygotes. R. M. I.

CATTELL, J. (Editor) 576.12
Biological Symposia—Volume IV. Population problems in Protozoa. Experimental control of development and differentiation. Theoretical and practical aspects of polyploidy in crop plants. The species problem. 576.356.5

Jaques Cattell Press, Lancaster, Pa 1941: Pp. vi + 293. figs. tables.

This volume contains four symposia on subjects of general biological interest. The first is on population problems in the Protozoa and is somewhat specialized, but the final paper of the series is more general, integrating detailed conclusions with biology as a whole.

The second symposium contains several important reviews on polyploidy, four of which have been abstracted in this issue of "Plant Breeding Abstracts" (cf. Absts. 1164, 1166 and 1311-2). The subject is treated both from a theoretical and practical point of view. There is a considerable diversity of opinion concerning the general evolutionary significance of polyploidy which is complicated by the present state of uncertainty as to the nature of the gene. A corrective to the over-enthusiastic use of polyploids for plant-breeding programmes is provided in the papers dealing with more practical questions.

Experimental control of development and differentiation form the subject of the third symposium. There are two botanical papers (cf. *Absts* 1167 and 1169) of a rather general nature while the remaining more detailed papers are zoological.

A very provocative paper by Hatch opens the fourth symposium on the species concept. The author puts forward the nominalist (more strictly conceptualist) notion that individuals alone are real while the species is a "logical form" imposed on organisms by the mind of the systematist. It follows from this point of view that the term has little objective value and that differences in opinion between taxonomists are largely a matter of taste. There are however a number of unsatisfactory statements in the paper. In the first place, the suggestion that "the species concept in biology is essentially a product of eighteenth century rationalism" is very difficult to accept. The concept is very clear, in botany at any rate, in the preceding century and can be traced back with little difficulty to the time of Aristotle. The general argument used by the author appears to be based on the diversity of opinion between systematists as to what constitutes a species and on the difficulty of distinguishing between specific and varietal delimitations. If however it is agreed that organisms differ in their intrinsic properties, thus establishing a plexus of morphological and physiological relations between themselves, the fact that authors disagree would mean that all adequately defined species are equally real, not that no species are real. Also a strictly nominalist attitude to the concept of the species would not concede objectivity to species distinguished by absence of inter-breeding. It seems in fact that the author's conclusion is based, not so much on induction from the data but on a conceptualist epistemology which denies the reality of relations.

The following paper by Bailey develops the hypothesis that natural selection may act indirectly on morphological characters through its effect on physiological characters to which the former are linked. The difficulty presented by the fact that the species considered (*Lymnaea columella*) has not evolved appreciably since the Cretaceous is noted.

Ecotypes and evolution in oceanic islands form the subjects of two final papers.

DOBZHANSKY, T. (Editor). 576.12
Biological Symposia—Volume VI. Temperature and evolution.
Isolating mechanisms. Genetic control of embryonic development.

Jaques Cattell Press, Lancaster, Pa 1942 : Pp. xii + 355. figs. plates. tables.

The three symposia included in this volume make an important contribution to biological theory. Nine articles make up the first symposium which deals with temperature, especially from the genetical and evolutionary points of view. All the papers are zoological but the results presented have a general biological application. Temperature may influence the course of evolution in many ways: by a direct effect on the mutation rate or by acting as a factor in natural selection and the development of isolating mechanisms.

Four papers are included in the second symposium which treats directly with the relative importance of the various isolating mechanisms. The first paper by G. L. Stebbins (jun.) has been referred to previously (cf. "Plant Breeding Abstracts", Vol. XIII, Abst. 752); the author assesses the importance of the various mechanisms with care although it is somewhat surprising to read that polyploidy "is a special case, not connected with the major trends of evolution". The hypothesis is also presented that species may differentiate by the occasional formation of fertile hybrids exhibiting partial intersterility with both the parents. The remaining three papers are zoological and deal both with isolating mechanisms of general biological interest and with others of more restricted significance.

All three papers of the third symposium on the "genetic control of embryonic development" are zoological. They are however of considerable interest to botanists whose appreciation of the theoretical importance of recent developments in embryology tends to be limited. The importance of synthesizing the somewhat divergent systems of genetics and embryology is stressed, especially as the preoccupation of geneticists with the units of inheritance has tended to obscure the importance of the organism as a whole which is the formal object of embryology.

MAYR, E. 576.12
Systematics and the origin of species from the viewpoint of a zoologist.

Columbia University Press, New York, Oxford University Press, London, E.C.4, 1942 : 26s. 6d. Pp. 334. 14 tables. 29 figs.

In this book, Dr Mayr presents a large and well-analysed body of facts bearing on the problem

of species formation. The evidence used is mainly zoological and drawn principally from the taxonomy and distribution of birds, on which subjects the author is a well-known authority. It is concluded that the neo-Darwinian theory is both the simplest and most adequate hypothesis applicable to the evolutionary process.

A detailed account of geographical variation is given which leads up to the difficult problem of defining the biological species. In this matter, as throughout the book, the author is at pains to define his terms carefully and distinguish between the various aspects of the problem under consideration, a procedure which adds weight to the conclusions derived. The species is shortly defined as a "group of actually or potentially interbreeding natural populations, which are reproductively isolated from other such groups". This is a wide definition in some respects and becomes equivalent to the polytypic species (*Rassenkreis*) in forms showing considerable geographical variation. On the other hand, the definition is narrow in its insistence on specific distinction in the case of non-interbreeding sympatric types. These are called sibling species and may be distinguished by no morphological differences whatsoever. The application of these concepts to plants is, as the author admits, questionable.

In the last four chapters of the book, the nature of the processes producing specific differentiation is discussed and it is decided that speciation is normally geographical, depending on the isolation of populations from each other. Much evidence is presented to demonstrate that many non-interbreeding populations have arisen in this way and it is suggested that the whole evolutionary sequence may be regarded as an extension of the same process. This is, of course, equivalent to a denial of any difference in kind between micro-evolution and macro-evolution and the author goes on to discuss some of the arguments used by Goldschmidt and others in defence of the distinction. It is in this part of the book that the author's point of view seems less cogent. The cosmopolitan species cannot evolve except by sympatric speciation and the explanations suggested are that evolution from such forms either does not occur or else occurs by rapid differentiation in an asexual stage. Other serious difficulties are presented by the series of distinct endemic species sometimes found in lakes for which the hypothesis of multiple colonizations is suggested. A similar suggestion is put forward to explain some of Willis's data on endemic species in Ceylon; this explanation however seems hardly applicable as the endemic species is found growing together with the presumed ancestral species which has a "wide" distribution. It is also difficult to explain some of the palaeontological data which show both orthogenetic tendencies and extreme persistence of many species.

Such points, of course, in no way detract from the thorough analysis of the whole question which the author presents. It must be remembered however that the conclusions are only meant to apply strictly to animals, which differ considerably from plants in the relative importance of their evolutionary mechanisms.

MATLIN, D. R.

578.08

Chemical gardening. Latest developments in soilless culture of plants.

Chemical Publishing Co., Inc., Brooklyn, N.Y. 1942: \$2.25. Pp. vi + 159. tables. plates.

This book deals rather briefly with the procedures for soilless culture of plants and very briefly with some of the physiologically active chemicals. Better accounts of both topics are already available.

J. L. F.

EMIG, W. H.

578.65

Stain technique.

Science Press Printing Co., Lancaster, Pa 1941: \$1. Pp. 75.

The majority of biological investigators accept existing stain techniques as ready-made and more or less standardized tools to be adapted for one's own particular purpose. When difficulties arise, the need is often felt for a more fundamental as well as a more extensive knowledge of stains. To the reader with a reasonable knowledge of organic chemistry, "Stain Technique" will be of value in this direction. It deals with the chemical aspects of staining and outlines the results of numerous tests with a wide range of synthetic organic dyes and a few natural organic dyestuffs.

J. L. F.

KLAGES, K. H. W.

581.5:581.9:633

Ecological crop geography.

MacMillan Co., New York 1942: \$4.50. Pp. xviii + 615. 66 tables. 108 figs.

The study of those aspects of physiology, ecology and geography which bear upon the cultivation of crop plants forms the basis for this extremely interesting new book. It is divided into four parts; the first three are general and deal respectively with the social environment, the physiological environment, and the ecological factors, while the last part, occupying nearly half the book, is concerned with the geographical distribution of the more important American crops.

There is perhaps implicit in the book's title a claim to have established a new branch of biological science. While this claim can hardly be admitted, agronomists and especially plant breeders have cause to be grateful to the author for the extent of the ground he has broken. There are many points with which to disagree, but nevertheless this is a book to be studied and also a valuable guide to further material for study.

J. L. F.

WULFF, E. V.

581.9

An introduction to historical plant geography.

Chronica Botanica Co., Waltham, Mass., Wm. Dawson and Sons, Ltd., London 1943: \$4.75. Pp. xv + 223. 35 figs.

Dr. Wulff's monograph on plant geography has already been reviewed in "Plant Breeding Abstracts" (see Vol. III, Abst. 35). The original Russian text has now been revised by Dr Wulff and translated into English by Miss Elizabeth Brissenden, working in close co-operation with Dr Wulff in Leningrad. By publishing the translation the Chronica Botanica Company has now made the monograph available to a wide public.

In the foreword Dr H. M. Raup of the Arnold Arboretum mentions a number of further works on the subject, more especially those dealing with the American aspect, or works that have appeared since the original monograph was written.

The original illustrations have been reproduced and a high standard of translation and of accuracy has been maintained.

FRENGUELLI, J.

581.9(82)

Rasgos principales de fitogeografía Argentina. (**Principal characteristics of the phytogeography of Argentina**).

Publ. Didácticas Divulg. Cient. del Museo de La Plata, República Argentina 1940: No. 2: \$3.00. Pp. 119. plates. figs.

In this monograph the author considers the Argentine flora under 3 main heads: forests, formations and associations without trees and transition associations, each of which is described separately, with its respective subdivisions. The volume is copiously illustrated with photographs of the different formations and their typical species.

DAHLBERG, G. and

63:03

JOHANSSON, I.

Svenskt Lantbrukslexikon. (**Swedish Agricultural Lexicon**).

A.-B. Svensk Litteratur, Stockholm 1941: Pt I: Pp. 572; Pt II: 573-1084.

This excellent, up-to-date and illustrated encyclopaedia of general agriculture has been compiled by many eminent Swedish scientific and agricultural experts and produced with all the judgment, care and superior workmanship that is characteristic of Scandinavian reference books of this type.

The two volumes contain not only information on agriculture in general but also on plant breeding and genetics, cytology, pests, viruses, vitamins, various aspects of live stock production, forestry and many other subjects of interest to those engaged in the study of the development of agriculture in its various branches.

It was found possible to ensure that much of the material contributed should be revised to include recent developments up to 1941, though in some cases contributors found revision impossible owing to lack of time and 1939 or 1938 had to be regarded as the terminal date.

The work should be of particular value in all technical, agricultural and similar libraries or educational institutions, where the importance of information from foreign sources is recognized. Scientific and technical translators and abstractors dealing with Swedish publications will also find the encyclopaedia extremely useful.

HELLBO, E. and

ESBO, H.

633.491:582(48.5)

Våra potatisorter. Systematisk behandling. (Our potato varieties.

A systematic study.)

Statens Centrala Frökontrollanstalt, Lantbruksförbundets Tidskriftsaktiebolag, Stockholm 1942: No. 1: Pp. 128. 3 plates. 15 figs.

The work of variety description in potatoes was started by the Swedish Seed Control Institute in 1932, when the 32 commonest varieties grown in Sweden were examined. Since that time the variety collection has been extended to include 160 varieties. About 40 plants of each variety have been examined every year, the descriptions being made at the time when the plants were just beginning to flower. Samples were grown in a number of different parts of the country.

The characters used in the descriptions were plant habit and height, colour and morphology of stem, leaf, inflorescence, and flower, tuber and sprout; time of ripening, quality and disease resistance are also considered. There is a general discussion of the various characters employed and of their value in varietal diagnosis.

The second half of the volume gives summarized descriptions of the varieties one by one, arranged according to flower colour, skin colour and flesh colour and after that alphabetically according to variety. Indications are also given of the origin of the varieties where it is known, of the uses for which each is grown and of the existence of certain synonyms.

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